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EXERCISES IN MENTAL ARITHMETIC

MIRICK-BALLOU-TALL

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PRACTICE EXERCISES IN MENTAL ARITHMETIC

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PREFACE

There are difficulties that retard the progress of children in their study of arithmetic which until recently were not recognized and are now too little considered by teachers. Dr. Charles H. Judd, in his report on the Survey of the St. Louis Public Schools, points to those in abstract arithmetic in these words:

It is a mistake to assume, for example, that addition is a single process in all of its different applications. The fact is that addition and all of the other arithmetical operations are among the most complex subjects in the course of study. Children have a great deal of difficulty with arithmetic because teachers do not understand the special difficulties which are encountered by individual children at different stages of their training.

In "How to Teach," by Strayer and Norsworthy, attention is called to this matter, as follows:

Investigation seems to give evidence that in the habit of simple column addition eight or nine different functions are involved, each of which involves the use of several bonds. Besides these positive connections a child in learning must inhibit other connections which are incorrect, and these must often outnumber the correct ones. And yet column addition has always been treated as a simple habit, with perhaps one element of complexity, when carrying was involved. It is evident that if the habit concerned does involve eight or nine different functions, a child might go astray in any one.

The mental difficulties that children meet in their study of arithmetic are not confined to abstract calculation. There are complexities no less troublesome when they solve problems.

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They must understand the situations in which the problems lie; they must exercise mathematical judgment to determine the processes to be used, and in many instances to choose one of two or three possible methods of solution; they must interpret the meaning of the language with which the problem is stated.

It seems to the authors that these parallel lines of difficulty are best overcome by giving special training in meeting each kind *separately.* They also believe that systematic training in both lines should begin not later than the third grade, that it should deal with the simple, fundamental arithmetical facts and the common types of problems, and that this training should have for its purpose the development of mathematical facility and skill.

The following characteristics of this book are in harmony with these convictions:

1. The exercises in abstract calculation have been separated from the exercises in problem solving, a page of the one following a page of the other.

The relation between the two series of exercises is close, in that the problems of each exercise involve the processes and combinations studied on the preceding page of abstract exercises, except the two pages of miscellaneous problems placed at the end of each quarter's work.

2. All the whole-number combinations essential to success in elementary arithmetic have been included in these exercises.

3. Repeated reviews of troublesome combinations are provided according to their relative degree of difficulty.

4. To guide teachers in the use of the exercises detailed directions are to be found on nearly every page.

5. The problems on each page deal with one familiar situation (except in the case of the miscellaneous problems). This leads to more sustained thinking in each phase of the daily life in which arithmetic is applied.

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6. The problems have been stated in all the different ways in which children are likely to meet them. Language difficulties have been carefully removed.

7. Emphasis is placed on the making of original problems by the pupils themselves. This exercise will train them to study their surroundings, to see their school arithmetic in its everyday use, and to apply their knowledge and skill gained in school to situations out of school.

The authors wish to acknowledge their indebtedness to Dr. Harry V. Holloway's "Experimental Study to Determine the Relative Difficulty of the Elementary Combinations in Addition and Multiplication." This study was made in 1913 and 1914, under the direction of the School of Education of the University of Pennsylvania, and its findings have been used as a guide in the selection of troublesome combinations.

The authors are under obligation, also, to the superintendents of the schools of Boston, of Cambridge, and of Arlington, Massachusetts, for permission to make trial of the exercises in the schools under their direction, and to the teachers who used with their pupils the first prepared exercises. In the light of these trials with a large number of pupils the exercises have been thoroughly revised.

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CONTENTS

PAGE

SUGGESTIONS TO TEACHERS xi

GRADE III. FIRST SERIES

EXERCISES

I–III. Addition: Numbers 0–9 2
IV. Problems: At Home (Addition) 3
V–VII. Addition: One and Two-Figure Numbers, Sums to 20 . . . 4
VIII. Problems: At Home (Addition) 5
IX–XI. Subtraction: Numbers 0–9 6
XII. Problems: At Home (Subtraction) 7
XIII–XV. Subtraction: Numbers 0–19 8
XVI. Problems: At Home (Subtraction) 9
XVII–XIX. Multiplication: Numbers 1–10 10
XX. Problems: At Home (Multiplication) 11
XXI–XXIII. Division: Even Quotients, Dividends to 100 12
XXIV. Problems: At Home (Division) 13
XXV. Problems: Miscellaneous 14
XXVI. Problems: Miscellaneous 15

GRADE III. SECOND SERIES

I–III. Addition: By Endings, No Carrying 16
IV. Problems: At Play (Addition) 17
V–VII. Addition: *Review*, Troublesome Combinations 18
VIII. Problems: At Play (Addition) 19
IX–XI. Subtraction: By Endings, No Borrowing 20
XII. Problems: At Play (Subtraction) 21
XIII–XV. Subtraction: *Review*, Troublesome Combinations 22
XVI. Problems: At Play (Subtraction) 23
XVII–XIX. Multiplication: Products to 100 24
XX. Problems: At Play (Multiplication) 25
XXI–XXIII. Division: Divisors 2–9, Dividends to 100 26
XXIV. Problems: At Play (Division) 27
XXV. Problems: Miscellaneous 28
XXVI. Problems: Miscellaneous 29

Digitized by Google

GRADE III. THIRD SERIES

EXERCISES		PAGE
I–III.	Addition: Two-Figure Numbers	30
IV.	Problems: At School (Addition)	31
V–VII.	Subtraction: Two-Figure Numbers	32
VIII.	Problems: At School (Addition)	33
IX–XI.	Addition: Two-Figure Numbers	34
XII.	Problems: At School (Addition)	35
XIII–XV.	Subtraction: Two-Figure Numbers	36
XVI.	Problems: At School (Subtraction)	37
XVII–XIX.	Multiplication: *Review*	38
XX.	Problems: At School (Multiplication)	39
XXI–XXIII.	Division: *Review*	40
XXIV.	Problems: At School (Multiplication)	41
XXV.	Problems: Miscellaneous	42
XXVI.	Problems: Miscellaneous	43

GRADE III. FOURTH SERIES

I–III.	Addition: United States Money, Two-Figure Numbers	44
IV.	Problems: Earning, Saving, and Spending (Addition)	45
V–VII.	Addition: United States Money, Two-Figure Numbers	46
VIII.	Problems: Earning, Saving, and Spending (Addition)	47
IX–XI.	Subtraction: United States Money, Two-Figure Numbers	48
XII.	Problems: Earning, Saving, and Spending (Subtraction)	49
XIII–XV.	Multiplication: United States Money, One- and Two-Figure Numbers	50
XVI.	Problems: Earning, Saving, and Spending (Multiplication)	51
XVII–XIX.	Multiplication: United States Money, Troublesome to 12 × 9	52
XX.	Problems: Earning, Saving, and Spending (Multiplication)	53
XXI–XXIII.	Division: Even Parts of Cents	54
XXIV.	Problems: Earning, Saving, and Spending (Division)	55
XXV.	Problems: Miscellaneous	56
XXVI.	Problems: Miscellaneous	57

GRADE IV. FIRST SERIES

To Teachers		58
Tables of Measurements		59
EXERCISES		
I.	Reading Numbers: 100–999	60
II, III.	Addition: Three One-Figure Numbers	60
IV.	Problems: At Home (Addition)	61
V.	Reading Numbers: I–L	62
VI, VII.	Addition: Three One-Figure Numbers	62

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EXERCISES		PAGE
VIII.	Problems: At Home (Addition)	63
IX.	Counting: By 2's, 3's, 4's, 5's, to 100	64
X, XI.	Subtraction: *Review* by Endings	64
XII.	Problems: At Home (Subtraction)	65
XIII.	Reading Numbers: United States Money to $10	66
XIV, XV.	Multiplication: *Review*, Easily Forgotten Combinations	66
XVI.	Problems: At Home (Multiplication)	67
XVII.	Reading Numbers: United States Money to $100	68
XVIII, XIX.	Multiplication: By 10, 20, 100, etc.	68
XX.	Problems: At Home (Multiplication)	69
XXI.	Reading Numbers: United States Money to $1000	70
XXII, XXIII.	Division: Divisor and Dividend Ending in Zero	70
XXIV.	Problems: At Home (Division)	71
XXV.	Problems: Miscellaneous	72
XXVI.	Problems: Miscellaneous	73

GRADE IV. SECOND SERIES

I.	Reading Numbers: 1000–5000	74
II, III.	Addition: United States Money to $10	74
IV.	Problems: At School (Addition)	75
V.	Reading Numbers: LI–C	76
VI, VII.	Addition: United States Money to $100	76
VIII.	Problems: At School (Addition)	77
IX.	Counting by 6's and 7's to 100	78
X, XI.	Subtraction: Troublesome Combinations	78
XII.	Problems: At School (Subtraction)	79
XIII.	Counting: By 8's and 9's to 100	80
XIV, XV.	Multiplication: *Review*	80
XVI.	Problems: At School (Multiplication)	81
XVII.	Counting: By 11's and 12's to 100	82
XVIII, XIX.	Multiplication: *Review*	82
XX.	Problems: At School (Multiplication)	83
XXI.	Reading Numbers: Common Fractions	84
XXII, XXIII.	Division: Two Types of Division	84
XXIV.	Problems: At School (Division)	85
XXV.	Problems: Miscellaneous	86
XXVI.	Problems: Miscellaneous	87

GRADE IV. THIRD SERIES

I.	Reading Numbers: Mixed Numbers	88
II, III.	Fractional Parts: $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$ of Numbers to 100	88
IV.	Problems: At the Newsdealer's Store	89

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EXERCISES		PAGE
V.	Counting: By Halves and Thirds to 10	90
VI, VII.	Measures: Length	90
VIII.	Problems: At the Dry-Goods Store	91
IX.	Counting: By Fourths and Fifths to 10	92
X, XI.	Measures: Areas	92
XII.	Problems: At a Hardware Store	93
XIII.	Measures: Solids	94
XIV.	Measures: Liquids	94
XV.	Measures: Dry Substances	94
XVI.	Problems: At the Provision Store	95
XVII.	Measures: Weight	96
XVIII, XIX.	Measures: Time	96
XX.	Problems: At the Bakeshop	97
XXI.	Measures: Counting	98
XXII.	Measures: Paper	98
XXIII.	Measures: United States Money	98
XXIV.	Problems: At the Stationery Store	99
XXV.	Problems: Miscellaneous	100
XXVI.	Problems: Miscellaneous	101

GRADE IV. FOURTH SERIES

I.	Two-Process Examples: Addition and Subtraction	102
II, III.	Addition: Four One-Figure Numbers	102
IV.	Problems of the Conductor	103
V.	Two-Process Examples: Addition and Subtraction	104
VI, VII.	Addition: Five One-Figure Numbers	104
VIII.	Problems of the Post Office	105
IX.	Two-Process Examples: +, −, and ÷	106
X, XI.	Making Change: To $100	106
XII.	Problems of the Fruit Seller	107
XIII.	Two-Process Examples: +, −, ×, and ÷	108
XIV, XV.	Multiplication: United States Money	108
XVI.	Problems of the Dairy	109
XVII.	Fractional Parts: With Remainders	110
XVIII, XIX.	Division: With Remainders	110
XX.	Problems of the Carpenter	111
XXI.	Fractional Parts: With Remainders	112
XXII, XXIII.	Division: With Remainders	112
XXIV.	Problems of the Farmer	113
XXV.	Problems: Miscellaneous	114
XXVI.	Problems: Miscellaneous	115

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SUGGESTIONS TO TEACHERS

MENTAL AND WRITTEN ARITHMETIC

The term *mental* is not a very happy one when used to distinguish so-called mental arithmetic from written arithmetic. Of course all arithmetic is in its origin mental. Writing has no place in arithmetic except as a means of recording the results of thinking and as a mechanical help to thinking when the computations are too complex for the mind to perform unaided.

Mental arithmetic and oral arithmetic are terms that are often used synonymously to designate that kind of arithmetical work that is done without the help of pencil, pen, or crayon. It is in this sense that *mental* is used in this book. All the exercises, abstract and concrete, are to be done without the pencil.

There are two considerations relating to written arithmetic that deserve the teacher's serious attention.

The first consideration is this: While writing is in theory merely a mechanical aid to mental arithmetic, as a matter of fact the act of writing does introduce new factors into the mental processes. It seems to influence the mind to use long, cumbersome, uneconomical ways of calculating, instead of the short, economical ways employed in purely mental calculation. This influence has been overlooked by teachers in the past; it has even been strengthened too often by an insistence upon long and elaborate "figuring" in all written work, although the same examples when done mentally have been calculated in simple, direct ways.

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This common practice is wrong and retards the development of both accuracy and speed. Pupils should be trained to do *all* written work, whenever it is possible, by the same methods of thinking that they use in mental work.

The second consideration to be taken account of in written arithmetic is this: In a comparison of the relative value of oral arithmetic and written arithmetic it should be recognized that the oral form of expression is a means of training; it is not an end in itself. While mental activity is fundamental to both oral and written expression, it is the written form that is by far the more used, and it is the form by which alone mathematical progress may be made into advanced fields.

Therefore, while the oral expression is insisted on for the exercises in this book, it is not for oral expression's sake; the exercises are devised to train pupils to use the fundamentals in arithmetic so skillfully that their written work may be done more easily and correctly. This oral efficiency should be "carried over" into written work, a teaching task whose difficulty is not generally recognized.

THE PURPOSE OF THIS BOOK

From the foregoing it will be seen that this book is not intended to replace the regular textbook. It has a different purpose. It is a supplement to it. In the regular textbook the oral exercises are principally to give practice in the new subject that has been taught. In this book all the exercises are to give practice in what should be already familiar, with a view to developing mastery, skill, and facility.

For instance, the first exercises in this book involve combinations that were learned doubtless in the first grade. From the Contents it will be seen that the work throughout is review

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so far as the number combinations are concerned. The methods of calculation and of drill are new, and these should lead to the laying of a solid arithmetical foundation.

From the foregoing it follows that this book, although used quite independently of the regular textbook, will greatly enhance the results from the use of the latter book.

THE ABSTRACT EXERCISES

The abstract exercises provide training in purely mental computations to the end that *each* pupil may acquire a reasonable degree of accuracy and speed (that is, proportioned to his native ability) in the arithmetic of his daily needs and in the arithmetic that is necessary to progress in mathematical study.

STANDARDS OF ACCURACY AND SPEED

If one should ask, "How accurate and how speedy should this mastery be?" the answer must be indefinite. The human brain is not an absolutely accurate machine, and its memory is not perfect. The action of the mind is much affected by weather, condition of health, either temporary or permanent, and by immediate social or other surroundings. Moreover, as noted previously, minds differ one from the other in their ability to attain accuracy and speed and in memory. There is, there can be, therefore, no absolute standard of mathematical attainments to which all pupils should be forced.

Professor Thorndike has said on this point that for the simple combinations in all the processes (that is, $6 + 7$, $13 - 7$, 9×3, $72 \div 8$), if a child can give his answers in three seconds there is absolute control over the process, and the process can be considered as under reflex control.

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It has been clearly proved, not alone in reading but in arithmetic, that slowness does not contribute to accuracy, but rather retards its development. The effort to accelerate seems to intensify attention. Perhaps a good general standard of speed is that of good oral reading, allowing for individual differences of temperament. In good oral reading, hurrying is avoided but a ready and intelligent rendering of the text *without hesitation* is desired.

In fact, these arithmetical combinations may be thought of as constituting an arithmetical vocabulary. It is as desirable, even as necessary, that pupils know the essential vocabulary in the one subject as that they know it in the other, and to the same degree of mastery.

USING THE ABSTRACT EXERCISES

1. It is a principle pretty well established in all lines of human activity that short periods of intensive practice are better in developing skill than long periods. It is impossible to make a hard-and-fast rule regulating the length of the period, but it should be long enough to allow each pupil to get some training. It therefore follows that the class should be small, not over twenty pupils. If a class is larger than this it should be divided into two groups for mental-arithmetic work. In a small class a good deal can be accomplished in ten minutes.

2. Show the pupils what you want them to do and how you want them to do it by going through the exercise for them.

In this showing-exercise use the speed that you wish the pupils to use and give only the answers as they should be given by the pupils; that is, they should not say "7 and 8 are 15," but looking at the combination they should say "15," as they read a word without spelling it.

Show the pupils in this way with each new exercise.

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3. While one pupil is reciting, all the others in the class should follow closely, watching for errors. If it is necessary to maintain attention, call on them out of turn to "go on from there."

4. Let each exercise be repeated until the majority of the class know and meet your standard.

5. From time to time have each pupil note on a piece of paper the combinations on which he hesitates. These are for private study.

6. Subordinate speed to accuracy, but do not forget nor neglect speed.

7. Practice should be varied by proceeding with the exercises from right to left, and up and down in columns.

8. The pencil should not be used in these exercises except as suggested in paragraph 5.

9. The suggestions for *methods of thinking* in connection with the exercises should be faithfully followed and applied also in all written work.

THE CONCRETE-PROBLEM EXERCISES

The problems in each quarter of the grade work deal with one familiar situation. In the first quarter of the third grade they relate to the home, in the second quarter to play, etc. This plan has been adopted so that pupils may think consecutively in one field of arithmetical application at a time. It is believed that this both simplifies and intensifies the thinking and prepares the pupils to study more intelligently the real situations about them when they are assigned the task of making original problems.

It will be noted also that the problems on each page involve the number combinations and the processes that have been studied on the opposite page of abstract exercises. The problems

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have been constructed to the end that pupils may become familiar with the different varieties of statement of problems in addition, subtraction, multiplication, and division.

These problems are not as difficult as most children of these grades can do. They are not standards of difficulty. On the contrary, like the abstract exercises, they are exercises to give facility and skill in interpreting problems. Therefore, language and number difficulties have been removed, and one process is dealt with in each exercise but set in a variety of simple language forms.

Two pages of miscellaneous problems are put at the end of each quarter's work to give further and more varied problem training.

MAKING ORIGINAL PROBLEMS

At the bottom of each page of problems is a suggestion that pupils make and bring to the class problems similar to those they have just solved. These problems should not be imaginary but real problems that they themselves discover in situations similar to those they have just solved on the same page.

There are two reasons for studying real situations in this way.

In the first place, if pupils have had no actual experience with the material described or dealt with in a problem, or in the situation in which the problem is set, that problem is as abstract as if the words were not used, but the figures only. You may test this for yourself by attempting to solve problems in navigation, astronomy, or any other field in which you are not familiar. Your trouble and confusion will be caused by your inability to *picture* the problem, and that inability will persist until you have had a concrete (that is, a real, first-hand, conscious) contact with the situation.

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In the second place, that contact must be a *conscious* one. It is one of the lessons that we teachers have been slow to learn; namely, that mere personal contact does not give us a knowledge of things. Our eyes do not see, our ears do not hear, our mind does not think about things until it begins to study them with a purpose. Children go year after year to the post office without being conscious of the peculiar nature of the post office. Country children live in the midst of nature without seeing nature. City children live under the shadow of tall skyscrapers without realizing what casts the shadow.

So the making of original problems, if the data for them are those actually discovered in a purposeful study of real situations, will open the minds of the pupils to their surroundings and will give them training in stating the problems they find there. Both of these values are fundamental in developing skill in solving problems.

THE USE OF THE PROBLEM EXERCISES

1. Let the entire page of problems be assigned to the class for silent reading.

2. The first lesson in class may be an oral reading and discussion lesson without reference to problem solving. The purpose is to understand the meaning of the problems and to exchange experiences relating to other similar situations. The character of the problems will lead to this discussion, it is hoped.

3. Now take the problems one by one. Each may be read again, orally or silently, as the teacher decides. The purpose now is to have the pupil see clearly and state (*a*) what is to be done and (*b*) the answer.

Of course the pencil will not be used.

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4. If the pupil makes a mistake in (*a*) or in (*b*) do not resort to explanations and questions; allow him to sit down and *think it out by himself* while the class proceeds with the next problem.

NOTE. Pupils think logically. Their minds are so made that logical thinking is their natural way of thinking. But the ability to state reasons, to give and understand "explanations," — that is, the *if's, and's, then's, therefore's, because's,* — develops after childhood has passed.

To put the matter in another way, the mind tends to act correctly in determining the process that should be applied in a given problem *once the problem situation is understood.* There need be, then, but an abundance of practice in dealing with word problems involving familiar situations to produce quickness and accuracy in this mental reaction.

5. Encourage and reward the use in written problems of methods of solution and of computation employed in mental exercises.

MATHEMATICAL JUDGMENT

Those who use numbers *skillfully* are constantly employing what may be called a *calculation* or a *computation judgment.* One out of many possible cases will illustrate this.

Problem. At $\$0.12\frac{1}{2}$ each, what do 10 handkerchiefs cost?

There is no doubt here about the process to be used. $\$0.12\frac{1}{2}$ is to be multiplied by 10. But there are at least three possible ways of making the calculation.

(1) $\$0.12\frac{1}{2}$
$\underline{\quad 10}$
5
120
$\$1.25$

(2) $\$0.12\frac{1}{2} = \$0.125$
$\$0.125 \times 10 = \$1.25$
(Multiplication by moving decimal point.)

(3) $\$0.12\frac{1}{2}$
$\$0.25 \times 5 = \$1.25$
(Multiplying by the factors of 10.)

This, it is evident, is a matter of *calculation judgment.* The question is which of three possible ways of multiplying is best in this particular case.

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To answer the question the pupil must have facility in using the different methods and readiness in applying each according to the conditions in given cases. This readiness and facility can come only with practice, and this practice should begin early. It is provided for in this book.

There is another need for judgment in determining the *best process* to apply in a given case. To illustrate:

Problem. If one handkerchief costs $\$0.12\frac{1}{2}$, how many can be bought for $\$1.50$?

Here there is a question of *what process* rather than of how to carry out the process. It is a question of how to solve the problem rather than of how to compute.

This problem may be solved by division, or by division and addition.

(1) $\$1.50 \div \$0.12\frac{1}{2} =$

$\$0.125\overline{)\$1.50}$

(or)

$\$1.50 \times \frac{2}{\$0.25} =$

(2) $\$0.12\frac{1}{2} = \$\frac{1}{8}$.

Then 8 handkerchiefs may be bought for $\$1.00$, and 4 handkerchiefs for $\$0.50$. Therefore 12 may be bought for $\$1.50$.

As in the case of calculation judgment this *process or problem judgment* develops with a knowledge of alternative methods of solution and with practice in applying different methods to the same problems until the judgments are made easily and quickly.

Training to this end should not be delayed too long, for clumsy and troublesome habits of work will become fixed, as they are fixed in the minds of so many school children to-day.

A beginning of training in this kind of judgment is made in connection with many problems in this book.

There is a third kind of mathematical judgment that children should be trained to use. It is involved in answering the

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question, "Is my answer reasonable?" If the minds of pupils are properly alert they will frequently ask: "Is this problem reasonable? Are the prices and quantities stated in the problem such as are likely to occur in real problems?"

Incentives to exercise this kind of judgment are scattered through this book, and it is hoped that teachers will make use of them. Additional opportunities for judging the reasonableness of the problems and of problem answers are given in the original problems that the children themselves make and bring to class.

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PRACTICE EXERCISES IN MENTAL ARITHMETIC

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GRADE III. FIRST SERIES

NOTE. Pupils should be trained to state the sums at the same rate of speed as they read familiar text. See Suggestions to Teachers.

I. ADDITION

A.	2	1	1	1	1	6	1	4	1
	1	3	9	7	1	1	5	1	8
B.	2	2	5	2	2	2	8	2	3
	2	6	2	7	9	3	2	4	3

II. ADDITION

A.	5	3	4	3	6	3	4	4	7
	3	7	3	8	3	9	4	9	4
B.	4	8	4	7	5	5	9	5	6
	5	4	6	5	5	6	5	8	6

III. ADDITION

A.	9	6	8	7	9	7	8	9	9
	6	7	6	7	7	8	8	8	9
B.	1	0	2	0	3	0	5	0	9
	0	1	0	2	0	4	0	6	0
C.	8	6	7	8	6	8	5	9	7
	9	8	9	5	9	7	7	4	6
D.	5	4	9	8	8	4	7	6	6
	9	7	3	3	8	8	3	4	5

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IV. PROBLEMS: AT HOME

1. In John's family there are 4 people. One day 3 friends come to dinner. How many plates should mother put on the table that day for dinner?

2. Usually John takes 5 minutes to get ready for dinner, but he spends 2 minutes more the day the visitors come. How long does he take that day?

3. It is a part of Susan's work at home to sweep the front and back steps each day. There are 6 front steps and 5 back steps. How many steps does she sweep?

4. How many stockings will mother mend if she finds that John has 3 stockings with holes in them and Susan has 3 stockings with holes in them?

5. There are 7 rugs on the floors upstairs and 8 rugs on the lower floor in John's home. If he cleaned them all, how many would be clean?

6. Susan's father decides to buy new curtains for the kitchen and for the dining room. How many curtains will be required for the 5 windows of the kitchen and the 3 windows of the dining room?

7. If John has 8 books in his library and Susan has 9 books in her library, how many books do they have together?

8. How many rolls does mother make when she bakes 9 in one pan and 6 in another pan?

Additional Work. *Each pupil should write out and bring to class a similar problem of his own.*

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NOTE. Train pupils to recognize the *total* sums at a glance, that is, 12 + 6 = 18; *not* 2 + 6 = 8, and 1 ten = 18. These are really a review of Exercises I–III.

V. ADDITION

A.	1	2	1	11	3	12	7	3	12
	10	10	11	2	16	4	10	12	5
B.	5	17	15	15	14	12	12	13	3
	13	2	3	5	4	2	6	3	14

VI. ADDITION

A.	15	11	12	5	6	2	3	16	13
	4	9	7	14	14	15	17	2	2
B.	16	13	0	9	11	14	1	13	14
	0	4	19	10	4	2	19	7	0
C.	16	13	14	16	2	14	13	2	15
	4	5	5	3	13	3	6	14	2

VII. ADDITION

A.	10 + 10 =	4 + 15 =	18 + 2 =	4 + 13 =
B.	12 + 8 =	13 + 5 =	15 + 5 =	4 + 16 =
C.	12 + 1 =	18 + 0 =	13 + 6 =	18 + 2 =
D.	0 + 20 =	13 + 4 =	2 + 17 =	16 + 3 =

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VIII. PROBLEMS: AT HOME

1. Samuel fills his mother's wood box every morning. One morning he filled it by carrying 9 sticks at one trip from the woodshed and 11 sticks at another trip. How many sticks filled the box?

2. How many minutes does Mary work when she helps her mother for 10 minutes washing the dinner dishes and 5 minutes setting the table?

3. If Samuel has 6 cents of his own in his pocket and his mother gives him 12 cents with which to do an errand, how much money does he carry to the store?

4. Mary is asked to dust all the chairs in the living room and dining room. There are 3 rockers and 11 other chairs. How many chairs are there to be dusted?

5. One day Mary puts her mother's workbasket in order. She finds 12 spools of white thread and 5 spools of colored thread. How many spools are in the basket?

6. If, one day after school out in the orchard, Sam picks up 8 quarts of pears and Mary picks up 12 quarts, how many quarts of pears do both children pick up?

7. When mother has put up 13 jars of peach preserves and 6 jars of cherry preserves, how many jars will she have for winter?

Additional Work. *Each pupil should write out and bring to class a similar problem of his own.*

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NOTE. Pupils should state the answers without repeating the numbers that are to be subtracted. See Suggestions to Teachers.

IX. SUBTRACTION

A.	2	3	9	7	1	1	6	5	4
	1	1	1	1	1	0	1	1	1
B.	2	6	2	7	9	5	8	4	3
	2	2	0	2	2	2	2	2	2

X. SUBTRACTION

A.	3	5	7	4	8	6	9	10	4
	3	3	3	3	3	3	3	4	0
B.	5	9	7	5	8	10	10	6	7
	5	4	4	4	4	2	6	4	5

XI. SUBTRACTION

A.	6	9	8	6	9	7	8	7	7
	5	5	5	6	6	6	6	7	0
B.	9	8	10	9	9	10	10	10	10
	7	7	8	8	9	5	3	7	10
C.	8	7	6	3	4	5	6	5	7
	0	0	0	3	4	5	2	3	4
D.	9	6	5	7	8	9	7	9	9
	5	4	2	3	5	4	5	7	2

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XII. PROBLEMS: AT HOME

1. Mother finds that she has 9 eggs. She uses 2 eggs in a cake. How many are left?

2. Hannah is sent to the store to buy a yeast cake. She is given 5 cents, and the yeast cake costs 2 cents. What change should she bring back?

3. If Hannah sets the supper table for 7 people and only 5 people come to supper, how many empty places are there?

4. Harry can walk to the store from his home in 8 minutes, but when his mother wants an errand done in a hurry, he can run there in 5 minutes. How many minutes does he save by running?

5. How much taller is Harry's father, who is 6 feet tall, than Harry, who is 3 feet tall?

6. There are 10 napkins to be laundered. When mother has laundered 3 of them, how many remain to be done?

7. Mother asks Hannah to pour 3 pints of milk into a bowl that will hold 8 pints. How many more pints will it take to fill it after Hannah has poured in her milk?

8. In the dining room there are 6 chairs. The family uses only 4 of them at breakfast time. How many chairs are unused at breakfast?

9. How many handkerchiefs has Harry after he has lost 2 from the 9 that he had after last Christmas?

Additional Work. *Each pupil should write out and bring to class a similar problem of his own.*

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NOTE. The exercises on this page give training in recognizing differences within the limits 11–19 in the minuend and 0–10 in the subtrahend.

XIII. SUBTRACTION

A.	11	11	12	11	12	11	12	14	11
	2	9	3	8	4	3	5	10	4
B.	11	12	15	11	11	12	11	12	13
	7	8	0	9	6	9	5	6	3

XIV. SUBTRACTION

A.	14	14	13	12	14	14	13	13	14
	4	5	5	7	6	9	6	4	7
B.	13	14	15	14	13	14	15	13	15
	7	9	7	7	9	8	9	8	6
C.	16	17	18	19	19	17	19	15	15
	2	5	2	7	3	2	4	3	2

XV. SUBTRACTION

A.	$15 - 8 =$	$16 - 7 =$	$17 - 8 =$	$18 - 10 =$
B.	$16 - 9 =$	$13 - 0 =$	$18 - 3 =$	$16 - 8 =$
C.	$18 - 4 =$	$17 - 3 =$	$18 - 9 =$	$19 - 6 =$
D.	$17 - 4 =$	$19 - 2 =$	$18 - 4 =$	$19 - 5 =$

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XVI. PROBLEMS: AT HOME

1. There are 14 days in 2 weeks. Of these 14 days children go to school 10 days. How many days in 2 weeks do children have no school?

2. Sarah invited 10 friends to her doll's party, but 4 of them could not come. How many came?

3. For the party Sarah counted out 18 lumps of sugar. Of these one dozen lumps were eaten. How many lumps were left?

4. What is the difference between Frank's age and Sarah's age if Frank is 9 years old and Sarah is 16 years old?

5. Sarah has 19 cents in her bank. She takes out the 19 cents to spend for a birthday present for her mother. How much is left in the bank?

6. It is Frank's work to keep the front walk clean. The walk is 18 feet long. After he has swept 12 feet of it, how many feet remain to be swept?

7. Mother buys 16 quarts of apples. She uses some for cooking and she gives some to the children. There are 7 quarts left. How many quarts were used?

8. The children have a party for which mother makes 17 pop-corn balls. After the party there are 5 pop-corn balls left. How many were eaten?

Additional Work. *Each pupil should write out and bring to class a similar problem of his own.*

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NOTE. Pupils should be trained to recognize (without conscious calculation) these products. They should become familiar with the fact that the product is the same whichever term is used as multiplier. For additional practice these exercises may be copied or written on the board, *reversing the terms.*

XVII. MULTIPLICATION

A.	1	2	3	2	3	10	6	4	3
	1	1	1	2	2	2	2	2	3
B.	5	8	9	4	7	5	9	7	10
	2	2	3	3	2	3	2	3	1

XVIII. MULTIPLICATION

A.	4	6	5	8	9	5	6	9	7
	4	3	4	3	4	5	4	5	4
B.	6	8	7	6	8	9	7	7	8
	5	4	5	6	5	6	6	7	6

XIX. MULTIPLICATION

A.	$7 \times 8 =$	$10 \times 10 =$	$9 \times 9 =$	$8 \times 8 =$
B.	$2 \times 10 =$	$8 \times 9 =$	$1 \times 7 =$	$7 \times 9 =$
C.	$5 \times 1 =$	$1 \times 5 =$	$5 \times 10 =$	$10 \times 5 =$
D.	$3 \times 10 =$	$4 \times 10 =$	$9 \times 10 =$	$10 \times 8 =$

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XX. PROBLEMS: AT HOME

1. Peter saves 3 cents a week for 7 weeks. How much money does he then have?

2. How many doll's dresses has Frances if she has 4 dolls and each doll has 4 dresses?

3. In the doll house there are 3 rooms. In each room there are 2 chairs. How many chairs are there in the doll house?

4. How much money should Frances take with her to the store when she goes to buy 6 buns at 2 cents each?

5. Mother has made 2 pats of butter to show you how to make them. She asks you to make 9 times as many. How many will you make?

6. Peter has a garden. He gives mother 1 bunch of radishes from it each day for a week. How many bunches does he give her?

7. If there are 5 people in a family and each one eats 3 rolls for breakfast, how many rolls must be baked for breakfast?

8. Frances wants to make a string of beads for each of her 4 dolls. She finds that 10 beads will make a very good string. How many beads does she need?

9. There are 8 chairs in the dining room. Each chair has 4 legs. How many legs have all the chairs together?

Additional Work. *Each pupil should write out and bring to class a similar problem of his own.*

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NOTE. Quotients should be recognized without conscious calculation, as in previous exercises. The teacher will note that in the following exercises the dividends are the products in the preceding multiplication exercises. For additional practice the dividends may be copied on the board, using for divisors the quotients in the following exercises.

XXI. DIVISION

A.	$1\overline{)1}$	$1\overline{)2}$	$1\overline{)3}$	$2\overline{)4}$	$2\overline{)6}$	$2\overline{)20}$
B.	$2\overline{)12}$	$2\overline{)8}$	$3\overline{)9}$	$2\overline{)10}$	$2\overline{)16}$	$3\overline{)27}$
C.	$3\overline{)12}$	$2\overline{)14}$	$3\overline{)15}$	$2\overline{)18}$	$3\overline{)21}$	$1\overline{)10}$

XXII. DIVISION

A.	$4\overline{)16}$	$3\overline{)18}$	$4\overline{)20}$	$3\overline{)24}$	$4\overline{)36}$	$5\overline{)25}$
B.	$4\overline{)24}$	$5\overline{)45}$	$4\overline{)28}$	$5\overline{)30}$	$4\overline{)32}$	$5\overline{)35}$
C.	$6\overline{)36}$	$5\overline{)40}$	$6\overline{)54}$	$6\overline{)42}$	$7\overline{)49}$	$6\overline{)48}$

XXIII. DIVISION

A.	$56 \div 7 =$	$100 \div 10 =$	$81 \div 9 =$	$64 \div 8 =$
B.	$20 \div 2 =$	$72 \div 8 =$	$7 \div 1 =$	$63 \div 7 =$
C.	$5 \div 5 =$	$5 \div 1 =$	$50 \div 5 =$	$50 \div 10 =$
D.	$30 \div 3 =$	$40 \div 4 =$	$90 \div 9 =$	$80 \div 8 =$

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XXIV. PROBLEMS: AT HOME

1. Mother wants to divide 9 pieces of candy among her 3 children. How many pieces shall she give to each child?

2. Harry has in his garden a row of peas 18 feet long. He plans to weed it during the next 6 days. How many feet should he weed each day?

3. There are 14 children at play. They counted off into 2 equal groups. How many children were in each group?

4. If the 14 children had counted off into 7 equal groups, how many would have been in each group?

5. Harold and Barbara had 2 children come to play with them. Mother gave them a dozen apples. If the apples were divided equally among the children, how many would each have?

6. The children were helping mother make sandwiches for a picnic. After a while she counted and said: "There are 20 sandwiches, and there will be 5 people. I wonder if it is enough." How many could each person have? (Do you think that would be enough?)

7. Mother's biscuit pan holds 18 biscuits. There are 3 long rows of biscuits in the pan. How many in each long row?

Additional Work. *Each pupil should write out and bring to class a similar problem of his own.*

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XXV. PROBLEMS: MISCELLANEOUS

NOTE. This lesson introduces what may be called the "completion type" of problem. The correct number should be read at the dash.

1. Mother said to Rebecca: "There are 7 in our family and we shall have 12 guests on Thanksgiving Day. If they all come we must set the table for —— people."

2. Father said: "For our own family a 6-pound turkey would be big enough, but if the other 12 people come we shall need a turkey 3 times as big. That will be an —— pound turkey."

3. For the Thanksgiving dinner mother baked 4 loaves of bread. She said, "If I cut each loaf into 10 slices, I shall have —— slices of bread." (Do you think that would be enough?)

4. Rebecca promised to make a place card for each of the 19 people that were expected at the Thanksgiving dinner. The day before Thanksgiving she found she had made only 9 of them. So she set to work to make the —— other cards.

5. Of the 19 people expected at dinner 2 sent word that they could not come. So the table was set for —— people.

6. To decorate the table father brought home the day before Thanksgiving 6 red roses and 9 white roses. This made —— flowers for the table.

Additional Work. *Each pupil should write out and bring to class a similar problem of his own.*

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XXVI. PROBLEMS: MISCELLANEOUS

1. Tom and Sam are building a playhouse of some bricks. Tom says, "I can carry 5 bricks at once." Sam says, "I can carry 3 more than that." How many can Sam carry?

2. Sarah picked 13 roses from a rosebush. She gave 7 of them to her mother. How many did she keep for herself?

3. If Sarah wanted to make 12 Christmas presents and finished 7 of them in November, how many were left to be made in December?

4. One week in the fall Tom spent 1 hour each day for 6 days raking up the leaves around the house. On counting it up he found that he had worked —— hours raking leaves.

5. Sarah spent 15 minutes sewing buttons on her doll's dress. In that time she sewed on 3 buttons. About how long did it take her to sew on 1 button?

6. It is Tom's work to keep his mother supplied with kindling wood. His father buys wood in sticks 4 feet long. If Tom saws these sticks into 4 pieces each, how long is each piece?

7. Tom finds that when he has sawed 5 sticks into 4 pieces each he has —— pieces.

8. Mother asks Sarah to find how many handkerchiefs she and Tom have. She finds 8 of Tom's and 7 of her own and reports that together they have —— handkerchiefs.

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GRADE III. SECOND SERIES

NOTE. Practice is here given in "addition by endings"; that is, in noting that the sum of two *units* is the same irrespective of the tens with which they may stand. Other combinations may be made for further practice on the board.

I. ADDITION

A.	10	20	30	42	52	62	7	17	27
	1	1	1	1	1	1	2	2	2
B.	37	47	77	6	16	26	7	17	87
	2	2	2	2	2	2	3	3	3

II. ADDITION

A.	5	15	25	95	3	23	63	6	26
	3	3	3	3	3	3	3	4	4
B.	56	5	75	85	4	14	24	3	43
	4	4	4	4	5	5	5	5	5

III. ADDITION

A.	73	3	53	83	2	12	22	3	33
	5	6	6	6	6	6	6	7	7
B.	43	10	20	30	11	21	31	10	20
	7	7	7	7	8	8	8	9	9
C.	6	16	26	16	5	15	25	3	13
	3	13	23	53	14	34	64	1	11
D.	23	13	6	26	36	6	15	15	25
	31	81	2	22	42	92	12	42	62

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IV. PROBLEMS: AT PLAY

1. At the beginning of the marble season Peter has 22 marbles. He buys 10 more. How many does he have then?

2. If Horace has 32 marbles and buys 10 more, how many does he have?

3. Ruth makes Peter a bag for his marbles. He puts 55 marbles in the bag. How many are in the bag after he has put in 4 more?

4. If Peter had put in the bag 35 marbles first and then 4, he would have had —— marbles in the bag.

5. How much money did Horace spend for marbles if he spent 12 cents that his father gave him and 8 cents that he earned?

6. Theodore spends 22 cents one day for marbles and 8 cents the next. On both days he spends —— cents.

7. Ruth likes to play marbles also. She buys 17 marbles and Peter gives her 2. She then has —— marbles.

8. If Horace gives her 2 marbles one day when she has 37, how many marbles does she have?

9. When the end of the marble season comes Peter counts his marbles and finds that he has 3 green and 13 yellow ones, or —— in all.

Additional Work. *Each pupil should write out and bring to class a similar problem of his own.*

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NOTE. The following are *review* exercises of the more troublesome combinations. Pupils should practice until they recognize these sums as readily as the easier ones, for on this readiness depends success in succeeding exercises.

V. ADDITION

A.	6	6	9	7	6	4	7	8	6
	2	6	4	9	8	6	6	3	9
B.	3	8	9	5	3	6	9	5	7
	4	5	9	9	2	5	2	7	2

VI. ADDITION

A.	4	5	4	6	1	8	9	8	7
	8	4	7	3	7	7	3	9	3
B.	3	8	16	13	5	2	2	12	13
	5	8	3	6	12	15	17	7	5
C.	4	13	5	4	19	7	5	9	18
	15	4	14	13	8	18	17	16	5

VII. ADDITION

A.	16 + 4 =	14 + 6 =	15 + 3 =	17 + 2 =
B.	3 + 17 =	13 + 7 =	17 + 7 =	6 + 16 =
C.	4 + 15 =	16 + 3 =	2 + 16 =	14 + 3 =
D.	18 + 6 =	4 + 19 =	7 + 16 =	5 + 19 =

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VIII. PROBLEMS: AT PLAY

1. Edith and Amy are jumping rope. Edith jumps 9 times and Amy jumps 4 times. They together jump —— times.

2. How many jumps does Edith make in two trials if on the first trial she jumps 8 times and on the second trial 3 times?

3. The two girls have jump ropes of different lengths. One is 5 feet long, the other 6 feet. If they were put end to end, how long a rope would they make?

4. Peter and Edith are playing jackstraws. After a time Peter counts his pile and finds he has 12 straws. Edith has 8 straws in her pile. How many straws have they both drawn?

5. Amy joins the game of jackstraws. If she draws out 7 straws and afterwards 11 more, how many should there be in her pile?

6. Peter and Will decide to put their money together to buy a baseball. Peter has 4 cents and Will succeeds in finding 6 cents. How much do they both have? (Is this enough to buy a ball?)

7. Some boys are getting ready for a snowball fight. They make 39 balls to use when they are attacked and 8 to throw at once. They then must have made in all —— balls.

Additional Work. *Each pupil should write out and bring to class a similar problem of his own.*

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NOTE. The following are exercises in "subtraction by endings"; minuends not exceeding 100, subtrahends not exceeding 9. Exercises do not involve "borrowing."

IX. SUBTRACTION

A.	11	21	31	41	14	24	34	64	94
	1	1	1	1	2	2	2	2	2
B.	13	33	53	45	85	76	26	86	16
	3	3	3	1	1	2	2	2	3

X. SUBTRACTION

A.	47	27	97	18	38	68	19	49	89
	4	4	4	5	5	5	6	6	6
B.	39	59	19	27	57	87	28	58	18
	4	4	4	5	5	5	6	6	6
C.	98	78	48	29	19	69	55	15	25
	3	3	3	5	5	5	2	2	2

XI. SUBTRACTION

A.	$19 - 7 =$	$59 - 7 =$	$99 - 7 =$	$29 - 7 =$
B.	$19 - 8 =$	$49 - 8 =$	$69 - 8 =$	$19 - 8 =$
C.	$29 - 9 =$	$89 - 9 =$	$17 - 3 =$	$27 - 3 =$
D.	$37 - 3 =$	$17 - 2 =$	$27 - 2 =$	$57 - 2 =$
E.	$16 - 4 =$	$36 - 4 =$	$19 - 3 =$	$49 - 3 =$

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XII. PROBLEMS: AT PLAY

1. The children are playing store. Richard has in his store 14 nails, 24 toothpicks, and 54 pins. If he sells 3 of each of these, how many of each has he left?

2. Marion makes for her store 5 mud pies, 15 loaves of bread, 35 rolls, and 25 cakes. She sells 4 of each of them and has left —— pies, —— loaves of bread, —— rolls, and —— cakes.

3. Richard puts some buttons that his mother has given him in 4 piles according to size. In the first pile are 9 buttons, in the second 29 buttons, in the third 69 buttons, and in the fourth 49 buttons. How many are left in each pile if he sells 7 buttons from each?

4. Sarah makes 23 glasses of lemonade in one pail and 13 glasses of orangeade in another pail. After she has sold 2 glasses from each pail she has left —— glasses of lemonade and —— glasses of orangeade.

5. Henry sells stationery in his store. He has 39 sheets of white paper and 59 sheets of yellow paper. Richard buys 6 sheets of each kind. How much of each kind does Henry have left?

6. Tom has in his store a pile of 88 beans, one of 38 peas, and one of 68 kernels of corn. Sarah buys 5 from each pile. How much has Tom left in each pile?

Additional Work. *Each pupil should write out and bring to class a similar problem of his own.*

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NOTE. The following are *review* exercises of the more troublesome combinations of minuends to 20 and subtrahends to 10. Pupils should recognize them as readily as they do the easier ones.

XIII. SUBTRACTION

A.	5	9	8	7	10	7	7	9	7
	3	4	3	2	4	5	4	2	3
B.	10	5	9	9	10	8	9	9	10
	2	2	7	5	6	2	3	6	3

XIV. SUBTRACTION

A.	10	11	13	12	11	12	11	12	13
	7	2	5	4	3	3	4	5	4
B.	13	11	14	11	12	14	11	12	14
	6	5	8	6	7	6	7	8	5
C.	10	12	14	18	19	18	17	19	17
	5	6	7	9	4	3	2	2	5

XV. SUBTRACTION

A.	$12 - 9 =$	$11 - 8 =$	$13 - 7 =$	$11 - 9 =$
B.	$13 - 8 =$	$15 - 6 =$	$16 - 7 =$	$17 - 8 =$
C.	$14 - 9 =$	$13 - 9 =$	$14 - 8 =$	$15 - 7 =$
D.	$17 - 9 =$	$15 - 8 =$	$16 - 9 =$	$15 - 9 =$
E.	$13 - 6 =$	$11 - 5 =$	$13 - 5 =$	$12 - 4 =$

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XVI. PROBLEMS: AT PLAY

1. In a potato race Luther misses 4 of the 12 potatoes in his row. How many does he pick up?

2. Susan picks up all of the 12 potatoes in her row, but 3 of them fall outside the box into which she should have dropped them. Therefore only —— potatoes are counted for her.

3. If 5 rows of potatoes are laid out for the race, but only 3 children take part, there are —— rows too many.

4. There are 18 grown people present to see the race. Of these 7 are men. How many women are there?

5. If there are 9 children present and only 3 of them take part in the race, there are —— children who watch.

6. After the potato race how many grown people are left if 5 of them go home?

7. A little later only 11 grown people are left; how many have then gone home?

8. Of the 9 children only 7 are able to stay to a picnic dinner. Then —— children are obliged to leave.

9. Four of the children at the dinner are boys. How many, then, are girls?

Additional Work. *Each pupil should write out and bring to class a similar problem of his own.*

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Note. Exercises in recognizing (without *conscious* calculation) products not exceeding 100: multiplicands of two figures, multipliers to 9. Pupils should recognize these products as readily as they do 2×3. These exercises may be put on the board with the order of the terms reversed.

XVII. MULTIPLICATION

A.	11	12	13	14	15	20	21	22	23
	2	2	2	2	2	2	2	2	2
B.	24	30	31	32	33	34	40	41	42
	2	2	2	2	2	2	2	2	2

XVIII. MULTIPLICATION

A.	43	44	11	12	13	20	22	23	30
	2	2	3	3	3	3	3	3	3
B.	31	32	33	11	12	20	21	22	11
	3	3	3	4	4	4	4	4	5

XIX. MULTIPLICATION

A.	$11 \times 5 =$	$12 \times 5 =$	$11 \times 6 =$	$12 \times 6 =$
B.	$11 \times 7 =$	$12 \times 7 =$	$11 \times 8 =$	$12 \times 8 =$
C.	$11 \times 9 =$	$25 \times 2 =$	$25 \times 3 =$	$25 \times 4 =$
D.	$50 \times 1 =$	$50 \times 2 =$	$35 \times 2 =$	$45 \times 2 =$
E.	$10 \times 1 =$	$11 \times 1 =$	$22 \times 1 =$	$44 \times 1 =$

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XX. PROBLEMS: AT PLAY

1. Jerry can run around the house in 45 seconds, but it takes his little brother twice as long. The little brother runs around the house in —— seconds.

2. How many marbles has James if he has 3 times as many as Warren, who has 20 marbles?

3. While little Ethel is making 15 mud pies, her older sister makes twice as many. How many does her sister make?

4. In Richard's play store 25 pebbles are called a bushel of potatoes. How many pebbles must he collect if he wants to have in his store 4 bushels of potatoes?

5. John has 23 marbles and so has each of his two friends. How many marbles have they together?

6. Ethel, Jane, and Rose are playing dominoes. Ethel counts 13 spots on the dominoes that she has left at the close of the game, and Jane counts 3 times as many on hers. How many does Jane count? Rose counts on her dominoes twice as many spots as Ethel does, or —— spots.

7. Hannah wants to buy a set of doll's dishes, but it costs 3 times as much as she has, for she has only 25 cents. What is the price of the dishes?

Additional Work. *Each pupil should write out and bring to class a similar problem of his own.*

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NOTE. Quotients should be recognized without *conscious* calculation. Divisors to 9; dividends to 100. These exercises are the reverse of Exercises XVII–XIX.

XXI. DIVISION

A.	$2\overline{)22}$	$2\overline{)24}$	$2\overline{)26}$	$2\overline{)28}$	$2\overline{)30}$	$2\overline{)40}$
B.	$2\overline{)42}$	$2\overline{)44}$	$2\overline{)46}$	$2\overline{)48}$	$2\overline{)60}$	$2\overline{)62}$
C.	$2\overline{)64}$	$2\overline{)66}$	$2\overline{)68}$	$2\overline{)80}$	$2\overline{)82}$	$2\overline{)84}$

XXII. DIVISION

A.	$2\overline{)86}$	$2\overline{)88}$	$3\overline{)33}$	$3\overline{)36}$	$3\overline{)39}$	$3\overline{)60}$
B.	$3\overline{)66}$	$3\overline{)69}$	$3\overline{)90}$	$3\overline{)93}$	$3\overline{)96}$	$3\overline{)99}$
C.	$4\overline{)44}$	$4\overline{)48}$	$4\overline{)80}$	$4\overline{)84}$	$4\overline{)88}$	$5\overline{)55}$

XXIII. DIVISION

A.	$55 \div 5 =$	$60 \div 5 =$	$66 \div 6 =$	$72 \div 6 =$
B.	$77 \div 7 =$	$84 \div 7 =$	$88 \div 8 =$	$96 \div 8 =$
C.	$99 \div 9 =$	$50 \div 2 =$	$75 \div 3 =$	$100 \div 4 =$
D.	$50 \div 1 =$	$100 \div 2 =$	$70 \div 2 =$	$90 \div 2 =$
E.	$10 \div 1 =$	$11 \div 1 =$	$22 \div 1 =$	$44 \div 1 =$

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XXIV. PROBLEMS: AT PLAY

1. Mother gives to Mary and her 4 friends an old clothesline for jump ropes. It is 30 feet long. If the clothesline is cut into equal lengths so that each girl has one, how long will each rope be?

2. In Arthur's yard there is a pile of old bricks. He counts them and finds there are 99 bricks in the pile. He makes 3 houses of equal size of the bricks, putting —— bricks into each house.

3. Eleanor's garden plot is square. It is 20 feet around. Each side must then be —— feet.

4. Esther has 5 dolls at her doll-party. Mother gives her 30 cakes, which she divides equally among her dolls. How many cakes does each doll have?

5. If 3 boys pay equally for a kite string that costs 18 cents, each boy's share is —— cents.

6. The twine is 90 feet long. If the boys divided it equally among themselves, each boy would have —— feet of string. (Would this be enough for a kite string?)

7. How much money will Martha spend if she divides 75 cents her uncle gives her into 3 parts and spends one of them?

8. Harriet has 25 cents, which she spends for little dolls that cost 5 cents each. How many dolls does she buy?

Additional Work. *Each pupil should write out and bring to class a similar problem of his own.*

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XXV. PROBLEMS: MISCELLANEOUS

1. Two boys buy a football together. One gives 50 cents towards it, the other 25 cents. The ball costs —— cents.

2. When the two boys come out of the store they find 20 other boys waiting to play with them. That makes —— boys ready for a game.

3. The boys are divided into 2 equal groups. That makes two teams of —— boys each.

4. One side makes 12 points the first half, and the same side makes 7 points the second half, or —— points in all.

5. When the game is over, one side has made 30 points and the other side has made twice as many. How many points has the other side made?

6. While the boys are playing football the girls are playing bean bag. There are at first 13 white bags and 3 blue bags, or —— bags in all.

7. Hattie joins the company and brings 4 white and 4 yellow bean bags. How many of each color do the girls now have to play with?

8. Hattie scores 7 points, and on a second try she scores 8 points. Her score then stands —— points.

9. Marion scores 8 points at first and then 8 points. How many points has she then? (Do this in two ways.)

Additional Work. *Each pupil should write out and bring to class a similar problem of his own.*

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XXVI. PROBLEMS: MISCELLANEOUS

1. One beautiful fall day a number of children go with their parents on a picnic. If there are 7 boys and 7 girls, how many children are there? (Do this in two ways.)

2. Each boy takes a lunch basket in each hand. There must have been —— baskets in all, for the parents had packed their lunches in the children's baskets.

3. Twenty people sat down to lunch. As there were 14 children, there must have been —— parents.

4. It was found that 4 children had brought 3 apples apiece. So there were —— apples for luncheon.

5. If there were 26 ham sandwiches and 16 chicken sandwiches, how many more were there of the ham than of the chicken sandwiches?

6. Each of the 14 children ate 2 olives. How many olives were eaten by the children? (Do this in two ways. Which way is easier?)

7. There were 6 olives left. The parents ate these, each having the same number. How many did each of the 6 parents have? (Do this in two ways. Which way is easier?)

Additional Work. *Each pupil should write out and bring to class a similar problem of his own.*

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GRADE III. THIRD SERIES

NOTE. These exercises give practice in recognizing *at a glance* the sum of two-figure numbers. Pupils should give the sums without naming the numbers.

I. ADDITION

A.	10	20	30	40	50	35	25	25	10
	10	20	30	40	50	35	25	75	11
B.	11	12	13	14	15	10	10	10	10
	11	12	13	14	15	12	13	14	15

II. ADDITION

A.	10	10	10	10	10	10	10	10	10
	16	17	18	19	20	30	40	50	60
B.	10	10	10	20	20	20	20	20	20
	70	80	90	30	40	50	60	70	80
C.	22	33	44	21	31	41	32	33	34
	22	33	44	21	31	41	32	33	34

III. ADDITION

A.	30 + 40 =	30 + 50 =	30 + 60 =	30 + 70 =
B.	40 + 50 =	40 + 60 =	11 + 12 =	11 + 13 =
C.	11 + 20 =	11 + 14 =	11 + 22 =	11 + 15 =
D.	11 + 18 =	11 + 16 =	11 + 17 =	21 + 18 =

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IV. PROBLEMS: AT SCHOOL

1. If in Harriet's schoolroom there are 22 boys and 21 girls, there are —— pupils present.

2. The room is divided into two classes. In one class there are 10 boys and 11 girls. How many pupils are there in this class?

3. How many are there in the second class, where there are 10 girls and 12 boys?

4. One day in Harriet's room there are 32 pupils and in Minnie's room 32 pupils. In both rooms there are —— pupils. (In what two ways can you do this example?)

5. If this school has a 20-minute recess in the morning and a 15-minute recess in the afternoon, how many minutes are given to recess during the day?

6. How long is the blackboard space in a room if the front board is 33 feet long and the side board 32 feet long?

7. In Minnie's room there were 28 pupils present on Monday and 11 pupils absent. What is the membership of the school?

8. Jerry is asked to count the reading books for his class. He finds two sets. One set has 25 books and another set has 25 books. How many books does he find? (Do this in two ways.)

9. How much time is given to arithmetic in Harriet's room if one class recites 12 minutes and the other 14 minutes?

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NOTE. Pupils should learn to recognize these differences *at a glance.* The limit of numbers used is the same as in the three preceding exercises.

V. SUBTRACTION

A.	10	16	70	20	17	80	30	80	60
	10	10	10	20	10	10	30	20	10
B.	70	50	11	90	11	25	12	15	12
	10	10	11	10	10	25	12	10	10

VI. SUBTRACTION

A.	13	18	75	40	14	60	14	15	13
	13	10	25	10	14	20	10	15	10
B.	50	30	30	35	40	50	20	40	19
	20	10	20	35	20	50	10	40	10
C.	22	34	42	24	33	45	36	32	37
	20	33	41	21	30	44	35	12	27

VII. SUBTRACTION

A.	$40 - 30 =$	$50 - 30 =$	$60 - 30 =$	$70 - 30 =$
B.	$50 - 40 =$	$60 - 40 =$	$12 - 11 =$	$13 - 11 =$
C.	$21 - 11 =$	$14 - 11 =$	$22 - 11 =$	$15 - 11 =$
D.	$18 - 11 =$	$16 - 11 =$	$17 - 11 =$	$33 - 11 =$

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VIII. PROBLEMS: AT SCHOOL

1. If there are 40 children in Elmer's school and 20 of these are boys, there must be —— girls.

2. How many pupils are present in Elmer's school if 40 belong and 10 are absent?

3. When 11 children stay in at recess on a rainy day, how many go out if 38 have come to school?

4. Elmer starts to school 35 minutes before it begins. It takes him 25 minutes to go to school. How long does he have to play before school begins?

5. If 40 children belong in Elmer's school and 45 belong in Jenny's, there are —— more pupils in Jenny's school than in Elmer's.

6. If in one class there are 15 boys and 11 girls, there are —— more boys in the class than girls.

7. The teacher asks Sam to put 23 pieces of chalk around the blackboards for the class to use. He can find only 13 pieces in the box. How many more does he need?

8. How much longer is the morning recess than that in the afternoon if the afternoon recess is 15 minutes long and the morning one is 20 minutes long?

9. The noon period is 90 minutes long. Susan can go home, eat her dinner, and be back again in 60 minutes. She has —— minutes to spare.

Additional Work. *Each pupil should write out and bring to class a similar problem of his own.*

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NOTE. Exercises to train pupils to think (without *conscious* reckoning) the sum of two-figure numbers. No "carrying"; sums of units and of tens less than 10. Pupils should *think from left to right.*

IX. ADDITION

A.	23	24	25	26	27	24	23	23	32
	32	42	52	62	72	24	23	55	45
B.	32	32	33	33	33	34	34	34	35
	57	63	44	55	66	53	23	44	63

X. ADDITION

A.	35	45	45	45	46	46	46	47	47
	42	22	33	44	33	22	53	12	42
B.	47	48	52	53	54	55	55	56	56
	52	31	25	35	45	22	44	23	33
C.	42	32	53	35	33	75	13	18	35
	37	43	24	62	45	24	65	41	44

XI. ADDITION

A.	56 + 33 =	62 + 35 =	63 + 36 =	64 + 24 =
B.	65 + 34 =	66 + 22 =	66 + 33 =	72 + 23 =
C.	72 + 24 =	81 + 18 =	72 + 25 =	72 + 17 =
D.	72 + 27 =	55 + 14 =	77 + 22 =	52 + 33 =

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XII. PROBLEMS: AT SCHOOL

1. In a certain school there were 45 readers of one kind and 44 readers of another kind. How many readers were there of the two kinds?

2. In a two-room building 72 children were present and 16 were absent. There must have belonged in the two rooms —— children.

3. How many pupils belonged in a school where 23 were girls and 31 were boys?

4. On a rainy day the teacher counted 17 pupils who did not go out at recess. There were 22 on the playground. How many were present that day?

5. If at the close of the school year 66 arithmetics were put away in the storeroom and 23 were sent away to be repaired, there must have been —— arithmetics in the school at the close of the year.

6. How many desks are there in a room where there are 22 on one side and 22 on the other side? (Think this problem in two ways.)

7. A sheet of paper is to be passed to each of the pupils in a class of 24 and a sheet to each in a class of 23. How many sheets must be counted out for both classes?

8. The teacher has 43 sheets and sends to the principal for 15 sheets more. Is that enough to give a sheet to each one in a class of 48 pupils?

Additional Work. *Each pupil should write out and bring to class a similar problem of his own.*

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NOTE. Exercises to train pupils to think the differences of two-figure numbers. No "borrowing" is required; therefore the differences should be thought from left to right as one reads.

XIII. SUBTRACTION

A.	41	49	42	48	59	51	58	52	45
	20	19	31	24	42	20	16	31	23
B.	70	57	46	49	47	62	53	52	63
	30	35	11	23	24	31	43	22	23

XIV. SUBTRACTION

A.	55	64	65	56	66	72	73	67	68
	30	44	60	24	33	40	31	24	34
B.	80	74	79	75	89	76	82	99	77
	40	22	45	25	41	46	82	22	11
C.	88	99	66	55	77	87	78	99	88
	55	25	43	22	77	77	77	66	34

XV. SUBTRACTION

A.	$75 - 35 =$	$78 - 54 =$	$88 - 44 =$	$83 - 30 =$
B.	$84 - 42 =$	$85 - 24 =$	$91 - 50 =$	$98 - 44 =$
C.	$92 - 41 =$	$86 - 35 =$	$93 - 33 =$	$97 - 65 =$
D.	$87 - 52 =$	$94 - 22 =$	$95 - 15 =$	$96 - 72 =$

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XVI. PROBLEMS: AT SCHOOL

1. Of a pile of 95 paper pads 35 were distributed to the pupils. How many pads remained in the pile?

2. If a school of 42 pupils uses 1 pad of white paper and 84 pads of yellow scratch paper a month, they use —— more yellow than white pads.

3. It requires 37 rubber erasers to supply one to each pupil in a school. The teacher finds she has only 22 erasers. How many more does she need for her school?

4. In Jerry's reading class of 25 children there are not enough books to go around. If 13 children listen while the others read, how many books are there?

5. Hester is in a class of 23 pupils. The teacher asked her to take enough arithmetics from a pile of 37 so that each of her class could have one. There are two ways for her to solve her problem. Which is the easier way?

6. Four packages of pencils contain 48 pencils. John is asked to take enough pencils to supply one to each of his class of 38 pupils. John can proceed in two ways. Which is the easier?

7. At the end of the year the teacher finds that of the 45 desks in her room 13 have been so badly scratched that they must be repaired. How many careful pupils were there in the school?

Additional Work. *Each pupil should write out and bring to class a similar problem of his own.*

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NOTE. These are *review* exercises in multiplication. Pupils should recognize products at a glance.

XVII. MULTIPLICATION

A.	1	10	44	12	25	32	23	33	50
	1	1	2	3	1	2	2	3	2
B.	70	34	20	30	21	32	21	11	25
	1	2	3	2	3	3	4	4	4

XVIII. MULTIPLICATION

A.	12	11	22	12	9	11	8	12	7
	4	5	4	5	6	7	9	6	8
B.	10	12	8	7	5	3	6	11	6
	9	8	8	9	8	9	8	6	7
C.	9	9	8	8	9	9	7	5	4
	12	8	7	12	9	7	12	9	9

XIX. MULTIPLICATION

A.	$6 \times 6 =$	$12 \times 7 =$	$4 \times 9 =$	$9 \times 9 =$
B.	$9 \times 11 =$	$5 \times 9 =$	$8 \times 4 =$	$7 \times 5 =$
C.	$8 \times 3 =$	$7 \times 7 =$	$7 \times 4 =$	$9 \times 1 =$
D.	$20 \times 2 =$	$30 \times 3 =$	$22 \times 3 =$	$33 \times 2 =$
E.	$44 \times 1 =$	$18 \times 1 =$	$60 \times 1 =$	$20 \times 5 =$

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XX. PROBLEMS: AT SCHOOL

1. If there are 25 pupils in your class and each pupil uses 3 pads of paper in a term, it will take —— pads to supply the class.

2. The teacher gives a box of 8 colored crayons to each child in a class of 12 children. How many crayons were there altogether?

3. If 30 sheets of paper were cut into 3 pieces each, it would be enough to supply —— pupils with one piece each.

4. There are 2 rooms in Jacob's schoolhouse. If in each room there are 42 desks, there must be —— desks in the two rooms. (Think this in two ways.)

5. A janitor collects 8 bushels of waste paper each day. He will then collect —— bushels in a school week.

6. Elizabeth is in a class of 23 children. They use 3 different reading books in one term. The teacher will need to order —— readers for that class for the term.

7. During the year in one room in a building 20 packages of composition paper are used. How many packages must be supplied to a 5-room building if each room uses the same amount?

8. If there are 22 books in each of 4 sets, how many covers are needed if each book is to be covered?

9. At the close of the year in one school 9 books were found to be worn out in each of 6 different sets of readers. Then —— new books should be bought for those sets.

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NOTE. These are *review* exercises in division. Pupils should recognize the quotients at a glance.

XXI. DIVISION

A.	$1\overline{)1}$	$1\overline{)2}$	$1\overline{)3}$	$1\overline{)10}$	$2\overline{)18}$	$2\overline{)22}$
B.	$3\overline{)30}$	$2\overline{)24}$	$3\overline{)36}$	$3\overline{)60}$	$3\overline{)39}$	$3\overline{)66}$
C.	$3\overline{)90}$	$3\overline{)63}$	$3\overline{)93}$	$3\overline{)69}$	$4\overline{)16}$	$4\overline{)40}$

XXII. DIVISION

A.	$4\overline{)20}$	$4\overline{)44}$	$4\overline{)48}$	$5\overline{)30}$	$5\overline{)40}$	$5\overline{)55}$
B.	$6\overline{)18}$	$6\overline{)36}$	$7\overline{)21}$	$7\overline{)35}$	$6\overline{)24}$	$6\overline{)66}$
C.	$7\overline{)28}$	$6\overline{)42}$	$7\overline{)49}$	$6\overline{)72}$	$7\overline{)56}$	$8\overline{)24}$

XXIII. DIVISION

A.	$84 \div 7 =$	$32 \div 8 =$	$27 \div 9 =$	$48 \div 8 =$
B.	$36 \div 9 =$	$63 \div 9 =$	$96 \div 8 =$	$80 \div 8 =$
C.	$99 \div 9 =$	$54 \div 9 =$	$81 \div 9 =$	$64 \div 8 =$
D.	$45 \div 9 =$	$72 \div 8 =$	$25 \div 1 =$	$99 \div 3 =$
E.	$77 \div 7 =$	$77 \div 1 =$	$20 \div 1 =$	$75 \div 3 =$

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XXIV. PROBLEMS: AT SCHOOL

1. The principal of a school has ordered 48 erasers for use at the blackboard. If these are divided equally among 4 rooms, each room will receive —— erasers.

2. If there were 8 rooms among which the 48 erasers were to be equally distributed; how many would each room receive?

3. There are 42 desks to be put into a schoolroom. If they are arranged in 6 rows, in each row there will be —— desks.

4. There are 3 classes in a school to be supplied with reading books, and 60 books are ordered. If the same number of books is given to each class, each will receive —— books.

5. There are 36 children in a school. The teacher separates them into 6 equal groups. How many children are in each group?

6. In a school of 44 pupils there are two classes of equal size. If one class is dismissed —— pupils remain at their seats.

7. The teacher gives the class in arithmetic slips of paper 9 inches long. She says, "Divide your slips into 3 equal parts." How long will each part be?

8. If the 9-inch strips were divided into 9 equal parts, each part would be —— inch long.

Additional Work. *Each pupil should write out and bring to class a similar problem of his own.*

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NOTE. These are *review* exercises in division. Pupils should recognize the quotients at a glance.

XXI. DIVISION

A.	$1\overline{)1}$	$1\overline{)2}$	$1\overline{)3}$	$1\overline{)10}$	$2\overline{)18}$	$2\overline{)22}$
B.	$3\overline{)30}$	$2\overline{)24}$	$3\overline{)36}$	$3\overline{)60}$	$3\overline{)39}$	$3\overline{)66}$
C.	$3\overline{)90}$	$3\overline{)63}$	$3\overline{)93}$	$3\overline{)69}$	$4\overline{)16}$	$4\overline{)40}$

XXII. DIVISION

A.	$4\overline{)20}$	$4\overline{)44}$	$4\overline{)48}$	$5\overline{)30}$	$5\overline{)40}$	$5\overline{)55}$
B.	$6\overline{)18}$	$6\overline{)36}$	$7\overline{)21}$	$7\overline{)35}$	$6\overline{)24}$	$6\overline{)66}$
C.	$7\overline{)28}$	$6\overline{)42}$	$7\overline{)49}$	$6\overline{)72}$	$7\overline{)56}$	$8\overline{)24}$

XXIII. DIVISION

A.	$84 \div 7 =$	$32 \div 8 =$	$27 \div 9 =$	$48 \div 8 =$
B.	$36 \div 9 =$	$63 \div 9 =$	$96 \div 8 =$	$80 \div 8 =$
C.	$99 \div 9 =$	$54 \div 9 =$	$81 \div$	$64 \div 8 =$
D.	$45 \div 9 =$	$72 \div 8 =$	25	$99 \div$
E.	$77 \div 7 =$	$77 \div 1 =$	2	7

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III. PROBLEMS AT SIGHT.

1. The principal of a school has ordered [illegible] for use in the classes. If there are [illegible] pupils in the school, how many books will be needed?

2. If there are [illegible] pupils altogether, what will be the number of [illegible] and how many pupils will there be in each class?

3. There are [illegible] in the fifth [illegible] [illegible] If [illegible] how many [illegible] will be ——— [illegible]

4. There are [illegible] in a school. If [illegible] books and [illegible] are [illegible] how many [illegible] If [illegible] each case, how [illegible] ——— [illegible]

5. There are [illegible] [illegible] a school. The [illegible] equalizes them into [illegible] equal groups. How many [illegible] are in each group?

6. In a school of ——— pupils there are [illegible] equal size. If one class is dismissed ——— pupils [illegible] in their [illegible]

7. The [illegible] [illegible] [illegible]

XXV. PROBLEMS: MISCELLANEOUS

1. If a school day is 5 hours long, how many hours are there in a school week?

2. In some schools there are 30 hours in a school week. In these schools a school day is —— hours long.

3. When schools keep 20 days each school month, at the end of a term of 3 months the schools have kept —— days.

4. Harry was out of school sick for 20 days during a period of 80 school days. How many days did he attend school during that time?

5. Judith is planning her school garden. She has a strip of ground 18 feet long. How many "hills" can she plant in a row if she plants them 3 feet apart?

6. If Judith plants her hills 2 feet apart she will have 9 hills. How many seeds will she need if she puts 4 seeds in each hill?

7. Joe planted tomatoes in his school garden. He has 6 vines and picks 6 good tomatoes from each vine. His crop of good fruit is then —— tomatoes.

8. Jerry picks 45 good tomatoes from his vines. He sells 25 of them to a neighbor and gives the rest, or ——. tomatoes, to his mother.

9. In a two-room school there are 40 boys and 35 girls. How many pupils belong to this school?

Additional Work. *Each pupil should write out and bring to class a similar problem of his own.*

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XXVI. PROBLEMS: MISCELLANEOUS

1. Ethel's class in school is given, 3 times a week, 5 words to learn to spell. At the end of the week the class has studied —— words.

2. At the end of a school month of 4 weeks Ethel's class in spelling has studied 60 words. Of these, 20 words did not need very hard study, for Ethel knew them pretty well already. How many hard words were there to be studied?

3. There are 26 letters in the alphabet. Henry can write the capital form of 22 of them. He is uncertain about —— capital forms.

4. On page 40 there are 56 examples. If you make a mistake in 16 of them, how many can you do correctly?

5. If by 4 minutes' study you have *mastered* the 16 difficult examples, how many have you mastered each minute?

6. There are three ways in which you can find out the number of examples in Exercise XXIII, page 40. What are the three ways and which is the best?

7. When you take 20 minutes to learn a lesson that you can learn in 15 minutes, how much time have you wasted?

8. If you can give the correct answer to each of the examples in Exercise XXIII, page 40, in 3 seconds, how long will it take you to do the entire exercise?

Additional Work. *Every pupil should write out and bring to class a similar problem of his own.*

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GRADE III. FOURTH SERIES

NOTE. The Fourth Series consists of exercises in using combinations that should now be familiar, but they appear here under the mask of United States money symbols.

I. ADDITION

A.	\$0.03	\$0.04	\$0.02	\$0.05	\$0.08	\$0.09
	.03	.04	.02	.05	.02	.01
B.	\$0.05	\$0.04	\$0.05	\$0.09	\$0.04	\$0.01
	.02	.01	.01	.02	.02	.01

II. ADDITION

A.	\$0.06	\$0.03	\$0.04	\$0.03	\$0.08	\$0.06
	.01	.02	.03	.01	.01	.02
B.	\$0.07	\$0.06	\$0.05	\$0.06	\$0.07	\$0.02
	.01	.03	.04	.06	.07	.01

III. ADDITION

A.	\$0.07	\$0.05	\$0.09	\$0.01	\$0.01	\$0.02
	.02	.03	.09	.03	.08	.06
B.	\$0.01	\$0.03	\$0.04	\$0.01	\$0.02	\$0.03
	.07	.06	.05	.02	.07	.05
C.	\$0.06	\$0.07	\$0.09	\$0.01	\$0.03	\$0.02
	.06	.07	.09	.03	.04	.03

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IV. PROBLEMS: EARNING, SAVING, AND SPENDING

1. If Ralph puts into his bank $0.05 of the money he received for doing errands, and the rest, amounting to $0.03, he spends for candy, he must have earned —— doing errands.

2. Ralph's little brother Tim helped him shovel snow from the sidewalk, and for this Ralph gives him at one time $0.01 and at another time $0.02. How much does little Tim earn in this way?

3. Joan is paid $0.02 at two different times for doing errands for the neighbors. For these two errands she receives ——. (In what two ways can you do this problem. Is one way easier?)

4. When Ralph has spent $0.05 for a ticket to a moving-picture show and $0.02 for gum, how much money has he spent?

5. Francis decides to put $0.09 aside in his Christmas-present fund. This is half of what he earned during the week. How much did he earn? (Do this problem in two ways.)

6. Ralph and Francis go to the drug store. Francis spends $0.05 for an ice-cream cone and Ralph spends the same amount for a soda. The clerk received from both boys ——. (Do this in two ways.)

7. How much money has Joan after she has found a nickel if she already had $0.03 in her pocketbook?

Additional Work. *Each pupil should write out and bring to class a similar problem of his own.*

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NOTE. The following are exercises in recognizing the more difficult addition combinations under the mask of United States money symbols.

V. ADDITION

A.	\$0.07	\$0.09	\$0.07	\$0.08	\$0.08	\$0.07
	.05	.05	.03	.04	.08	.04
B.	\$0.09	\$0.08	\$0.06	\$0.06	\$0.07	\$0.09
	.03	.03	.04	.05	.06	.06

VI. ADDITION

A.	\$0.09	\$0.09	\$0.08	\$0.08	\$0.08	\$0.09
	.08	.04	.06	.05	.07	.07
B.	\$0.04	\$0.08	\$0.04	\$0.03	\$0.05	\$0.05
	.07	.08	.08	.07	.09	.07
C.	\$0.03	\$0.05	\$0.03	\$0.06	\$0.04	\$0.06
	.09	.06	.08	.07	.06	.09

VII. ADDITION

A.	\$0.05 + .08 =	\$0.07 + .09 =	\$0.07 + .08 =
B.	\$0.06 + .08 =	\$0.08 + .09 =	\$0.09 + .05 =
C.	\$0.09 + .04 =	\$0.07 + .05 =	\$0.08 + .06 =
D.	\$0.08 + .07 =	\$0.09 + .06 =	\$0.09 + .07 =

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VIII. PROBLEMS: EARNING, SAVING, AND SPENDING

1. When Lois has saved $0.09 and has received $0.08 as a gift, she has —— that she can put in the bank.

2. Frank has $0.08 and he earns $0.08 raking leaves from the yard. How much has he that he can use towards the purchase of a bat? (Do this in two ways.)

3. Frank and Arthur want to start a play store. Frank can put into the partnership $0.05 and Arthur can put in $0.07. Together they have —— with which to buy things for their store.

4. If Lois spends $0.04 for cookies for her doll's party and $0.06 for fruit, how much does her party cost?

5. How much does Lois earn all day Saturday if her mother gives her $0.06 for helping her in the morning, and in the afternoon a neighbor gives her $0.07 for taking the baby for a ride in the baby carriage?

6. Arthur's father agrees to give him $0.07 a week to keep his mother supplied with coal for the kitchen stove. How much does he receive at the end of two weeks? (Do this in two ways. Which way do you prefer?)

7. On the first day of December Frank and Lois begin to think of Christmas. Frank counts his money. It amounts to $0.09. Lois counts hers and says that she has $0.07. How much do they have together with which to buy Christmas presents?

Additional Work. *Each pupil should write out and bring to class a similar problem of his own.*

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NOTE. The following are exercises in recognizing differences of what should now be familiar combinations, but under the mask of United States money symbols.

IX. SUBTRACTION

A.	\$0.09	\$0.01	\$0.04	\$0.08	\$0.05	\$0.09
	.01	.01	.02	.02	.05	.02
B.	\$0.05	\$0.06	\$0.08	\$0.03	\$0.04	\$0.06
	.01	.02	.01	.01	.03	.01

X. SUBTRACTION

A.	\$0.03	\$0.04	\$0.05	\$0.08	\$0.09	\$0.07
	.02	.01	.02	.03	.05	.02
B.	\$0.07	\$0.09	\$0.07	\$0.08	\$0.08	\$0.07
	.05	.05	.03	.04	.08	.04
C.	\$0.09	\$0.03	\$0.06	\$0.05	\$0.06	\$0.06
	.09	.01	.04	.03	.03	.06

XI. SUBTRACTION

A.	\$0.09 − .03 =	\$0.08 − .03 =	\$0.06 − .04 =
B.	\$0.07 − .06 =	\$0.09 − .04 =	\$0.09 − .08 =
C.	\$0.09 − .07 =	\$0.08 − .07 =	\$0.08 − .05 =
D.	\$0.09 − .05 =	\$0.07 − .05 =	\$0.03 − .03 =

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XII. PROBLEMS: EARNING, SAVING, AND SPENDING.

1. Jerry earns $0.10 and spends $0.09. He has —— left.

2. If Rosa has $0.08 in the bank and takes out $0.08, how many cents has she left in the bank?

3. How much money does Joe have when he reaches the store if his mother gives him $0.07 and he loses $0.02 on the way?

4. Joe reaches the store with $0.05 and buys a yeast cake for $0.03. The storekeeper should give him —— in change.

5. When Jerry has saved $0.08 he decides to put $0.05 in his bank. He has then —— left to spend.

6. Jerry and Joe have $0.07 each. How much more does Jerry have than Joe?

7. Rosa goes to a candy shop. She can buy 3 candy balls for a cent or 2 chocolate creams for a cent. Which kind can she buy more of for a cent, and how many more?

8. Joe can buy a pair of shoe strings for $0.05 or two pairs for $0.09. How much will he save by buying two pairs at one time? (You can do a part of this in two ways. Which is the better way?)

Additional Work. *Each pupil should write out and bring to class a similar problem of his own.*

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NOTE. The following are exercises in thinking the products of what should be familiar combinations, but under the mask of United States money symbols. They contain the thirty-six combinations of numbers to 12 × 9 (out of a possible seventy-two) that give the *least* difficulty.

XIII. MULTIPLICATION

A.	\$0.10 × 1	\$0.08 × 2	\$0.02 × 2	\$0.02 × 1	\$0.05 × 1	\$0.12 × 1
B.	\$0.06 × 1	\$0.07 × 1	\$0.03 × 2	\$0.09 × 1	\$0.03 × 3	\$0.05 × 2

XIV. MULTIPLICATION

A.	\$0.03 × 1	\$0.04 × 1	\$0.11 × 1	\$0.10 × 2	\$0.10 × 4	\$0.04 × 2
B.	\$0.05 × 5	\$0.07 × 2	\$0.10 × 3	\$0.09 × 2	\$0.01 × 1	\$0.11 × 2
C.	\$0.05 × 3	\$0.06 × 2	\$0.05 × 4	\$0.08 × 2	\$0.10 × 5	\$0.07 × 3

XV. MULTIPLICATION

A.	\$0.04 × 3 =	\$0.04 × 4 =	\$0.10 × 6 =	\$0.12 × 2 =
B.	\$0.10 × 8 =	\$0.10 × 7 =	\$0.03 × 5 =	\$0.02 × 6 =
C.	\$0.04 × 5 =	\$0.02 × 8 =	\$0.03 × 7 =	\$0.03 × 4 =
D.	\$0.02 × 12 =	\$0.02 × 11 =	\$0.02 × 9 =	\$0.02 × 7 =

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XVI. PROBLEMS: EARNING, SAVING, AND SPENDING

1. Ned earns \$0.25 on Monday and \$0.25 on Tuesday; how much has he earned by Tuesday night? (Do this in two ways. Which way do you prefer?)

2. Ned has \$0.04 and his sister Lucy has four times as much. Then Lucy has ——.

3. Joseph charges \$0.10 for cleaning snow from a sidewalk. If he cleans 5 sidewalks during one snowstorm, how much does he earn? (Do this in two ways and tell which is the easier way.)

4. Jenny has \$0.08 in her bank and Mary, her older sister, has eight times as much. How much has Mary? (Do this in two ways. Which is the better way?)

5. Ned goes to the store to buy Christmas cards. He selects those that sell for \$0.03 each. He buys 7 of them and pays ——.

6. Lucy buys 4 cards that cost \$0.05 each. How much does she pay?

7. If Jenny earns \$0.12 a week, how much will she earn in a fortnight?

8. Little Tom helps his big brother sell newspapers. A profit of \$0.01 is made on each paper. When Tom has sold 12 papers he has made ——.

Additional Work. *Each pupil should write out and bring to class a similar problem of his own.*

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NOTE. The following are the products of the more difficult combinations of numbers to 12 × 9 arranged in the probable order of progressive difficulty.

XVII. MULTIPLICATION

A.	\$0.10	\$0.11	\$0.06	\$0.11	\$0.06	\$0.11
	9	3	3	5	6	4
B.	\$0.06	\$0.08	\$0.11	\$0.06	\$0.11	\$0.08
	4	5	7	5	6	3

XVIII. MULTIPLICATION

A.	\$0.11	\$0.09	\$0.09	\$0.07	\$0.11	\$0.12
	8	5	3	5	9	3
B.	\$0.07	\$0.08	\$0.12	\$0.09	\$0.07	\$0.12
	4	4	4	9	7	5
C.	\$0.07	\$0.09	\$0.08	\$0.12	\$0.08	\$0.09
	6	4	6	6	8	6

XIX. MULTIPLICATION

A.	\$0.12 × 9 =	\$0.09 × 8 =	\$0.08 × 7 =	\$0.12 × 7 =
B.	\$0.09 × 7 =	\$0.12 × 8 =	\$0.06 × 8 =	\$0.06 × 12 =
C.	\$0.04 × 9 =	\$0.06 × 9 =	\$0.09 × 12 =	\$0.08 × 9 =
D.	\$0.07 × 8 =	\$0.07 × 12 =	\$0.07 × 9 =	\$0.08 × 12 =
E.	\$0.25 × 4 =	\$0.25 × 3 =	\$0.25 × 2 =	\$0.50 × 2 =

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XX. PROBLEMS: EARNING, SAVING, AND SPENDING

1. When Sam has sold 9 heads of lettuce from his garden for $0.05 a head, he has earned ——.

2. When radishes are selling in the market for $0.03 a bunch, Julius will save —— for his mother if he gives her 9 bunches out of his garden.

3. Harriet works 4 hours one week in her garden. If her time is worth $0.08 an hour, what is the value of the time she has put into garden work during the week?

4. Sam is paid $0.12 for pulling 100 weeds out of the lawn. How much will be due him when he has pulled 800 weeds? (Is this too much or too little for pulling weeds?)

5. Julius prefers to work by the hour and is paid at the rate of $0.11. After he has worked 9 hours he has earned ——.

6. Sam puts in his bank $0.06 out of every $0.12 he earns. After he has pulled 800 weeds he should put —— in his bank.

7. From what he earns each hour Julius takes $0.06 to put away for Christmas presents. How much has he put aside after he has received pay for 9 hours' work?

8. At Christmas time Harriet wishes to spend $0.25 on a present for each of her 3 friends. How much money will she need?

Additional Work. *Each pupil should write out and bring to class a similar problem of his own.*

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NOTE. The following are exercises in thinking the quotients of what should now be familiar combinations, but under the mask of United States money symbols. The products in Exercises XVII–XIX are here used as dividends.

XXI. DIVISION

A.	$9\overline{)\$0.90}$	$3\overline{)\$0.33}$	$3\overline{)\$0.18}$	$5\overline{)\$0.55}$	$6\overline{)\$0.36}$
B.	$4\overline{)\$0.44}$	$4\overline{)\$0.24}$	$5\overline{)\$0.40}$	$7\overline{)\$0.77}$	$5\overline{)\$0.30}$
C.	$6\overline{)\$0.66}$	$3\overline{)\$0.24}$	$8\overline{)\$0.88}$	$5\overline{)\$0.45}$	$3\overline{)\$0.27}$

XXII. DIVISION

A.	$5\overline{)\$0.35}$	$9\overline{)\$0.99}$	$3\overline{)\$0.36}$	$4\overline{)\$0.28}$	$4\overline{)\$0.32}$
B.	$4\overline{)\$0.48}$	$9\overline{)\$0.81}$	$7\overline{)\$0.49}$	$5\overline{)\$0.60}$	$6\overline{)\$0.42}$
C.	$4\overline{)\$0.36}$	$6\overline{)\$0.48}$	$6\overline{)\$0.72}$	$8\overline{)\$0.64}$	$6\overline{)\$0.54}$

XXIII. DIVISION

A.	$\$1.08 \div 9 =$	$\$0.72 \div 8 =$	$\$0.56 \div 7 =$	$\$0.84 \div 7 =$
B.	$\$0.63 \div 7 =$	$\$0.96 \div 8 =$	$\$0.48 \div 8 =$	$\$0.72 \div 12 =$
C.	$\$0.36 \div 9 =$	$\$0.54 \div 9 =$	$\$1.08 \div 12 =$	$\$0.72 \div 9 =$
D.	$\$0.56 \div 8 =$	$\$0.84 \div 12 =$	$\$0.63 \div 9 =$	$\$0.96 \div 12 =$
E.	$\$1.00 \div 4 =$	$\$0.75 \div 3 =$	$\$0.50 \div 2 =$	$\$1.00 \div 2 =$

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XXIV. PROBLEMS: EARNING, SAVING, AND SPENDING

1. Sam receives $0.45 for 9 heads of lettuce that he sells from his garden. How much does he receive for each head?

2. Paul's mother would pay $0.27 for 9 bunches of radishes if she bought them at the store. If Paul sells those he raises in his garden at the same rate, he will charge —— a bunch.

3. Harriet thinks that when she has worked 4 hours in her garden she has put in work to the value of $0.32. This is at the rate of —— an hour. (Does Harriet estimate her work at too high a value?)

4. Paul is paid $0.99 for 9 hours' work. How much does he receive an hour? (Is this good pay for a ten-year-old boy?)

5. From the money Sam receives for pulling weeds he puts in his bank $0.48. He earns this money by pulling 800 weeds. How much does he earn for his bank by pulling 100 weeds?

6. Paul has a Christmas fund of $0.54. He has taken it from the money he earned by working 9 hours. How much did he earn each hour for his Christmas fund?

7. At Christmas time Harriet spends $0.75 for presents for her 3 friends. She pays the same for each present. Then she spends —— for each friend.

Additional Work. *Each pupil should write out and bring to class a similar problem of his own.*

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XXV. PROBLEMS: MISCELLANEOUS

1. Uncle Reuben has a cherry tree. He tells John, Harry, and Ralph that he will give them $0.03 a quart to pick the cherries. John picks 10 quarts, Harry 12 quarts, and Ralph 8 quarts. How much does Uncle Reuben pay each boy?

2. Uncle Reuben sells 9 quarts of cherries for $0.81. What is the price for a quart?

3. If the cherries cost $0.03 a quart to pick and they are sold for $0.09, Uncle Reuben makes a profit of —— on each quart that he sells.

4. Uncle Reuben has a pear tree also. He agrees to pay the boys $0.11 a bushel to pick the pears. How much should Ralph receive for picking 4 bushels? (Which is the easier of the two possible ways of doing this?)

5. If Harry works 6 hours picking pears and receives $0.66, how many pears did he pick during that time?

6. Harry earns $0.09 while John is earning $0.07. Then he earns —— more than John does in the same time.

7. If Harry earns $0.03 more than John does in an hour, he will be worth —— more than John at the end of 5 hours.

Additional Work. *Each pupil should write out and bring to class a similar problem of his own.*

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XXVI. PROBLEMS: MISCELLANEOUS

1. Eleanor, Bessie, and Hester have the same amount of money. They put it all in a pile and find that they have together $0.30. Then each one must have had ——.

2. Eleanor spends $0.06 of her $0.10 and has —— left.

3. Bessie loses $0.01 of her $0.10 and puts the rest in the bank. How much does she put in the bank?

4. Hester buys a ticket to the "movies" for $0.05. Of her $0.10 she has —— left.

5. One day in the autumn the three girls with two of their friends rake the leaves from the lawn and receive $0.05 each from Hester's mother for doing it. Hester's mother paid —— for having the leaves raked from the lawn.

6. Eleanor earned that same week $0.03 for going on an errand and $0.09 for helping mother with the dishes. At the end of the week how much did she have to add to the $0.05 earned in raking leaves?

7. Bessie is given $0.02 a day if she is careful to throw the bedclothes over the foot of her bed every morning. If she remembers this every day, in 9 days she can earn ——.

8. Ned and 4 of his friends form a saving club. Each promises to save $0.07 a week. If the boys keep their promise, how much will they together save in a week?

Additional Work. *Each pupil should write out and bring to class a similar problem of his own.*

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TO TEACHERS

Before beginning the work of the fourth grade it will be well to make sure that the pupils are proficient in the third-grade work. It would not be amiss to go rapidly through all the abstract exercises with those classes that have not studied them. At least the Third and Fourth Series should be reviewed.

If a review as extensive as that suggested is not desired, have pupils practice the combinations on pages 46, 52, and 54, for these are the combinations that give the most trouble.

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TABLES OF MEASURES

NOTE. Only those items are included in the following tables that pupils of fourth-grade age are accustomed to meet in their out-of-school life.

MEASURES OF LENGTH

12 inches (in.) = 1 foot (ft.)
3 feet (ft.) = 1 yard (yd.)

MEASURES OF SURFACE OR AREA

144 square inches (sq. in.) = 1 square foot (sq. ft.)
9 square feet (sq. ft.) = 1 square yard (sq. yd.)

MEASURES OF SOLIDS

1728 cubic inches (cu. in.) = 1 cubic foot (cu. ft.)
27 cubic feet (cu. ft.) = 1 cubic yard (cu. yd.)

MEASURES OF LIQUIDS

4 gills (gi.) = 1 pint (pt.)
2 pints (pt.) = 1 quart (qt.)
4 quarts (qt.) = 1 gallon (gal.)

MEASURES OF DRY SUBSTANCES

2 pints (pt.) = 1 quart (qt.)
8 quarts (qt.) = 1 peck (pk.)
4 pecks (pk.) = 1 bushel (bu.)

MEASURES OF TIME

60 seconds (sec.) = 1 minute (min.)
60 minutes (min.) = 1 hour (hr.)
24 hours (hr.) = 1 day (da.)
7 days (da.) = 1 week (wk.)
365 days (da.) = 1 year (yr.)
52 weeks (wk.) = 1 year (yr.)
12 months (mo.) = 1 year (yr.)

MEASURES OF UNITED STATES MONEY

10 mills = 1 cent (¢ or ct.)
10 cents = 1 dime (d.)
10 dimes = 1 dollar ($)
100 cents = 1 dollar

MEASURES OF PAPER

24 sheets = 1 quire
500 sheets = 1 ream

COUNTING

12 units = 1 dozen (doz.)
144 units = 1 gross (gro.)
12 dozen = 1 gross (gro.)

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GRADE IV. FIRST SERIES

I. READING NUMBERS

NOTE. Pupils should not use the word *and* in reading whole numbers. 242 should be read "two hundred forty-two"; 301 should be read "three hundred one."

A.	113	222	345	401	510	635	808
B.	950	708	872	698	384	999	650

II. ADDITION

NOTE. As in previous exercises pupils should *see* the sums without *conscious* calculation.

A.	1	1	1	1	1	1	1	1	1
	1	1	1	1	1	1	1	2	2
	2	3	4	5	6	7	8	2	3
B.	1	1	1	1	2	2	2	2	2
	2	2	2	2	2	2	2	2	2
	4	5	6	7	2	3	4	5	6

III. ADDITION

A.	3	3	3	3	3	3	3	4	4
	2	2	2	3	3	3	1	4	4
	3	4	5	1	3	4	5	1	2
B.	4	2	1	1	5	3	1	2	4
	1	6	8	7	3	4	7	6	3
	5	2	1	2	2	3	1	1	2

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IV. PROBLEMS: AT HOME

1. John lives at 205 Edgewood Avenue, Mary at 444 South Street, and Harry at 520 Stanley Road. (Be sure that you can read these numbers correctly.)

2. Harold lives on a farm. In April his father put into the chicken incubator 912 eggs. In three weeks 887 chickens were hatched. Read the numbers correctly.

3. Sarah lives in the country. She goes 2 miles to school, 3 miles farther to the village, and 1 mile beyond the village to the railroad station. The station is —— miles from Sarah's home.

4. Mother sends Edith to the store to buy Christmas presents. How many dolls does she buy if she buys 2 for her little sister, 2 for her cousin Lottie, and 4 for the neighbors' children?

5. Frank counts up the number of children whom he wishes to invite to his party. There are 3 boy friends and 3 girl friends besides his 2 sisters. How many does he invite?

6. How many quart jars of preserves does Julia's mother make if she puts up 7 jars of peaches, 2 jars of pears, and 1 jar of plums?

7. Julia goes to her aunt's home to make a visit. It takes a day to go, she spends 5 days there, and it takes a day to return. Then Julia spends —— days away from home.

Additional Work. *Each pupil should write out and bring to class a similar problem of his own.*

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V. READING NUMBERS

A. I II III IV V VI VII VIII

B. IX X XI XXII XXXIII XL XLI XLV

C. XLVI XLIX L XIV XVI XXVII XXXVIII

VI. ADDITION

NOTE. Train pupils to see *at a glance* the two numbers that *in sequence* make 10 and then add the third number. The skill gained in this practice should be carried over into all column and line addition.

A.	1	1	2	2	3	3	4	4	5
	1	2	3	4	5	6	7	8	9
	9	8	7	6	5	4	3	2	1
B.	5	4	2	3	1	8	6	9	7
	5	6	8	7	9	2	4	1	3
	1	4	5	1	6	7	8	4	6

VII. ADDITION

A. 1+9+1= 2+8+3= 4+7+3= 5+5+5=

B. 4+6+7= 8+4+6= 7+6+4= 9+1+5=

C. 7+1+9= 9+8+2= 8+3+7= 7+3+9=

D. 6+7+3= 4+9+1= 8+2+5= 7+2+8=

E. 1+9+8= 7+3+7= 4+6+4= 2+8+2=

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VIII. PROBLEMS: AT HOME

1. Lilian and Joseph were playing school. Lilian was teaching Joseph to make Roman numbers. Here are some questions she asked him. Answer them if you can.

a. How do you make the Roman number *five*?

b. What do you do to the Roman *five* to make the Roman *four*?

c. What do you do to the Roman *five* to make the Roman *six*?

d. How do you make the Roman *ten*?

e. Change the Roman *ten* to the Roman *nine*; change it to the Roman *eleven*.

2. Have pupils ask each other similar questions about Roman numbers.

3. Joseph has a hen that hatched only 2 chicks from a dozen eggs. Joseph gave her 3 other chicks that had strayed from their mother, and 7 whose mother a hawk had carried off. This made —— chicks for the mother hen.

4. Lilian collected 6 eggs from one nest, 4 from another nest, and 8 from a third nest. How many eggs did she find?

5. There are three parts to the driveway from the street to the garage at Joseph's house. From the curbstone to the front fence is 4 feet. From the fence to the corner of the house is 6 feet. From the corner of the house to the garage is 7 feet. Then the driveway is —— feet long.

Additional Work. *Each pupil should write out and bring to class a similar problem of his own.*

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IX. COUNTING

A. Count by 2's to 100.

B. Count by 3's to 99.

C. Count by 4's to 100.

D. Count by 5's to 100.

X. SUBTRACTION

NOTE. Before taking this exercise review pages 20 and 22.

A.	5	15	15	25	25	7	17
	2	2	12	2	22	3	13
B.	37	57	9	19	19	49	7
	23	43	2	2	12	22	4
C.	17	57	8	18	28	58	58
	4	54	3	3	13	13	43
D.	9	19	19	39	17	27	57
	5	5	15	35	7	7	7

XI. SUBTRACTION

A.	$17-10=$	$18-13=$	$28-13=$	$28-23=$
B.	$48-43=$	$50-30=$	$75-25=$	$60-40=$
C.	$52-22=$	$33-11=$	$66-22=$	$55-33=$
D.	$77-22=$	$44-11=$	$50-25=$	$50-20=$
E.	$41-11=$	$51-11=$	$57-7=$	$57-57=$

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XII. PROBLEMS: AT HOME

1. Fred's mother had a basket of eggs from which she wished to sell 5 dozen. She asked Fred to count them out by 2's. Count them for Fred. Fred thought he could count them out more quickly by 3's. Why would he not count them out by 4's or 5's? Could he easily count them out by 6's?

2. From a bag containing 20 pounds of flour Fred's mother takes enough to do the Saturday baking. On weighing the bag later it is found to contain 14 pounds, so his mother must have used —— pounds.

3. Mother asks Jenny to polish the knives, forks, and spoons. Of the knives there are 24, but 2 are kitchen knives that do not need polishing. That leaves —— knives to be polished.

4. When Jenny has polished 12 knives there are —— knives left, but only —— knives remain to be polished.

5. If there are 23 forks in all and 10 of them are steel while the rest are silver, how many are silver?

6. There are 48 spoons — some teaspoons and some tablespoons. Jenny picks out the tablespoons and finds that there are 14 of them. How many teaspoons are there?

7. There are in all 93 articles to be polished. Jenny works an hour, and then there are still 50 articles to polish. She had polished —— articles in the hour.

Additional Work. *Each pupil should write out and bring to class a similar problem of his own.*

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XIII. READING NUMBERS

NOTE. When reading dollars and cents the word *and* should be used at the period only. $101.10 is read "one hundred one dollars and ten cents."

A.	$1.10	$1.01	$3.00	$5.50	$6.25
B.	$0.16	$0.04	$0.35	$9.15	$7.05
C.	$8.80	$3.20	$4.44	$9.99	$0.90

XIV. MULTIPLICATION

NOTE. Have pupils give the products as rapidly as they read a page of easy prose. Additional practice may be given by reversing the order of the numbers.

A.	12	9	8	12	9	9	12	12	12
	9	8	7	8	9	7	11	10	7
B.	8	9	9	11	9	8	12	7	12
	8	5	4	10	6	4	12	7	6
C.	12	8	7	6	8	11	7	11	8
	5	6	6	6	5	6	4	11	3

XV. MULTIPLICATION

A.	$7 \times 3 =$	$12 \times 4 =$	$6 \times 5 =$	$11 \times 7 =$
B.	$12 \times 3 =$	$9 \times 3 =$	$11 \times 8 =$	$6 \times 4 =$
C.	$8 \times 2 =$	$11 \times 9 =$	$11 \times 3 =$	$6 \times 3 =$
D.	$6 \times 2 =$	$10 \times 6 =$	$12 \times 2 =$	$9 \times 2 =$

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XVI. PROBLEMS: AT HOME

1. If Jerry sleeps 9 hours every night for 5 nights, he will sleep —— hours in that time. How many hours will he sleep in 10 nights? (In what two ways can you find the second answer? Which is the better way?)

2. If Jerry lies in bed 6 minutes every morning after he is called, he loses in this way —— minutes in a week; in 2 weeks he loses —— minutes. (Do this second part in three ways. Which is the best way?)

3. Jerry spends 12 minutes every morning before school helping his mother. During the school week he spends —— minutes in this way. How many hours is this?

4. The walk from the house to the sidewalk is 11 feet long. If Jerry clears this walk of snow 3 times in one month he has cleared in all —— feet of walk. If during the winter he clears this walk 9 times, he has during the winter cleared in all —— feet. (Do this second part in three ways. Which is the best way?)

5. Mother's napkins are 1 foot square. Then each one contains —— square feet of cloth. A dozen napkins contain —— square feet of cloth. Three dozen contain —— square feet. (Do the last part in three ways, selecting the best.)

Additional Work. *Each pupil should write out and bring to class a similar problem of his own.*

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XVII. READING NUMBERS

A.	$10.01	$25.10	$17.60	$38.19	$47.35
B.	$50.50	$60.05	$89.19	$75.25	$54.45
C.	$90.09	$98.88	$77.77	$15.00	$30.00

XVIII. MULTIPLICATION

NOTE. Have pupils notice that the easy way to multiply by 10 is to annex a zero to the multiplicand.

A.	1	2	3	9	4	5	6	7	8
	10	10	10	10	10	10	10	10	10
B.	10	11	12	15	20	22	30	42	55
	10	10	10	10	10	10	10	10	10

XIX. MULTIPLICATION

NOTE. Have pupils notice that the easy way to multiply by a multiple of 10 is to multiply first by the "significant" figure and then to annex as many zeros as there are zeros in the multiplier. The zeros in the multiplier may lie to the right of or under the multiplicand.

A.	14	14	10	10	10	20
	10	20	10	20	30	40
B.	32	32	2	2	2	12
	10	20	40	200	500	300

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XX. PROBLEMS: AT HOME

(When you read the following numbers be sure that you put *and* in them at the right places.)

1. Mabel's father paid in house rent in a year $264. He paid for his year's supply of coal $90.90. For an automobile he paid $795.

2. In Mabel's home each window has 12 panes of glass. Then in 10 windows there are —— panes. In 20 windows there are —— panes. (Do this second part in two ways.)

3. How many pounds of coal does Mabel's mother burn in her kitchen stove in 10 days if each day she burns 12 pounds? How much will she burn in the month of November? (Do the last part in two ways. Which way is the easier?)

4. Mabel has invited 9 girl friends to a party. She wants to have 4 cookies for everyone in the party. How many cookies must she have?

5. She makes 6 bean bags with which to play games. Into each bag she puts 200 beans. There will be —— beans in the six bags.

6. If in Mabel's family 3 pounds of table butter are used every week, in 10 weeks the family uses —— pounds.

7. Mabel's mother preserves eggs in "water glass" in 5 jars. She puts 30 eggs in each jar. Then she preserves —— eggs in all.

Additional Work. *Each pupil should write out and bring to class a similar problem of his own.*

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XXI. READING NUMBERS

A.	\$101.01	\$205.50	\$100.25	\$330.12
B.	\$200.10	\$510.07	\$601.75	\$989.90
C.	\$414.00	\$800.86	\$716.64	\$555.55

XXII. DIVISION

NOTE. When both divisor and dividend end with a zero, teach pupils to omit them both (in written work draw a line through them) before dividing; for example, $40 \div 20 = 4 \div 2$.

A.	$1\overline{)1}$	$10\overline{)10}$	$10\overline{)20}$	$10\overline{)30}$	$10\overline{)40}$
B.	$10\overline{)110}$	$10\overline{)240}$	$20\overline{)60}$	$20\overline{)80}$	$20\overline{)120}$
C.	$30\overline{)30}$	$30\overline{)60}$	$30\overline{)90}$	$30\overline{)120}$	$50\overline{)50}$

XXIII. DIVISION

A.	$18 \div 9 =$	$180 \div 90 =$	$80 \div 40 =$	$210 \div 30 =$
B.	$160 \div 80 =$	$270 \div 90 =$	$250 \div 50 =$	$180 \div 60 =$
C.	$240 \div 30 =$	$150 \div 30 =$	$220 \div 110 =$	$330 \div 110 =$
D.	$160 \div 40 =$	$120 \div 60 =$	$240 \div 20 =$	$180 \div 90 =$

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XXIV. PROBLEMS: AT HOME

NOTE. When you read the following numbers be sure that you use *and* only at the decimal points.

1. Elsa's father buys a piano for $350, a piano stool for $4.50, and a music cabinet for $10.25. His bill for the three purchases amounts to $364.75.

2. Elsa's father is a market gardener. He raised 400 bushels of potatoes and stored them in bins holding 20 bushels each. They filled —— bins.

3. One day Elsa's father takes to market 120 heads of lettuce, which are packed in boxes, 20 heads in a box. How many boxes of lettuce does he carry to market?

4. He has 220 pints of strawberries, which he puts into 220 boxes. Each of the boxes must contain —— pints of berries.

5. Elsa's mother has a piece of cloth that she wishes to make into 10 towels. The cloth is 20 yards long. How long is the cloth for each towel? If she wanted to make 20 towels, how long would she cut each piece?

6. The sidewalk in front of Elsa's house is 100 feet long. How many boys must be hired to shovel the snow from this walk if each boy is paid to shovel 50 feet?

7. Elsa's father has 120 pounds of parsnips that he wishes to put in boxes holding 20 pounds each. He will need —— boxes.

Additional Work. *Each pupil should write out and bring to class a similar problem of his own.*

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XXV. PROBLEMS: MISCELLANEOUS

1. David lives at No. 708 Park Avenue, and Louise lives at No. 819 Park Avenue. Read the numbers correctly.

2. It is house-cleaning time at David's home. Mother plans to have the windows washed. There are 4 panes of glass in each window. How many panes are there in 10 windows? (Do this in two ways, by counting by 4's and by multiplying. Which is the easier way?)

3. David's father buys 17 tons of coal for winter. Of this 10 tons is for the furnace, and the rest, —— tons, is for the kitchen stove.

4. Louise is wiping the dishes for her mother. She puts 3 plates on top of a pile of 4 plates, and later she puts on the pile 3 more plates. How many are then on the pile?

5. Uncle Henry gave Louise half a pound of chocolate creams and her mother a pound of the same kind. Louise counted her creams and found that there were 20 of them. At the same rate how many creams would her mother have?

6. There are 24 hours in a day. Children should sleep at least 9 hours a day. If they do, how many hours will they have left for work and play? How many hours will they have for work and play in 20 days?

Additional Work. *Each pupil should write out and bring to class a similar problem of his own.*

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XXVI. PROBLEMS: MISCELLANEOUS

1. The children are playing "Hide and Seek." Jack is "it" and must stand still with his eyes shut while he counts by 5's to 100. How quickly can you do this without making a mistake?

2. Hannah's mother usually fries 18 doughnuts on Saturday, but company is coming and she thinks she should have 28 doughnuts. She will need to fry —— more than usual.

3. One day in vacation Jack is helping in the hayfield. After the hay is all raked up they count 47 stacks. On the first load 12 stacks are pitched. That leaves —— stacks in the field.

4. After two loads of hay have been taken from the field 22 stacks are left. Then —— stacks have been carried away on the two loads.

5. The farmer whom Jack is visiting has 20 cords of wood that he has planned to sell in the city. He expects to carry it in 10 loads of equal size. How much will he load on the cart at one time?

6. This same farmer has 80 pecks of apples that he puts into 20 boxes of equal size to carry to market. Each box must hold —— pecks. This is the same as —— bushels.

Additional Work. *Each pupil should write out and bring to class a similar problem of his own.*

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GRADE IV. SECOND SERIES

I. READING NUMBERS

NOTE. See Note, p. 60.

A.	1000	1100	1110	1101	1001
B.	2105	3060	2400	4075	5000
C.	3009	1090	4800	4999	2002

II. ADDITION

NOTE. Pupils should look at each combination carefully and give the sums from left to right without naming the numbers to be added.

A.	\$1.08	\$7.05	\$9.08	\$9.04	\$8.20
	.05	5.01	6.01	7.02	6.10
B.	\$9.40	\$6.20	\$6.05	\$9.10	\$9.70
	5.10	3.02	5.05	4.01	3.10
C.	\$8.00	\$5.07	\$9.09	\$7.08	\$8.06
	7.00	4.07	8.09	4.08	3.04

III. ADDITION

A.	\$9.70 + 2.02 =	\$7.04 + 6.30 =	\$5.03 + 3.10 =
B.	\$7.06 + 3.06 =	\$6.40 + 2.40 =	\$5.08 + 2.04 =
C.	\$6.10 + 3.30 =	\$8.07 + 2.05 =	\$9.09 + 6.07 =

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IV. PROBLEMS: AT SCHOOL

1. Herbert goes to a large city school in which there are 40 schoolrooms. In this school 1610 pupils are enrolled. There are 3040 pupils in one of the other schools of that city. (Be careful about the use of *and* when you read these numbers.)

2. All the things you use in school cost money. Who pays for them?

3. In Herbert's school it costs \$5.60 to supply all the pupils with pencils during the year, and to supply them with erasers it costs \$1.20. These two articles alone cost ——.

4. The desks cost \$6.75 each and the seats \$3.00 each. What do a desk and seat together cost?

5. If you lose or destroy a reader costing \$0.35 and an arithmetic costing \$0.40, how much should you pay to the teacher?

6. It probably costs \$8.00 to supply a set of readers for your school and \$9.00 to supply a set of arithmetics. How much will these two sets cost?

7. If it costs \$7.50 to supply your school with paper the first half year and \$6.40 the second half year, the paper you have used during the year costs ——.

8. Have pupils find the cost of various articles used in school and make original problems in addition.

Additional Work. *Each pupil should write out and bring to class a similar problem of his own.*

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V. READING NUMBERS

A. LI LII LIV LV LVII LIX LX

B. LXI LXIII LXX LXXI LXXIV LXXX LXXXI

C. LXXXV XC XCI XCIV XCVI XCIX C

VI. ADDITION

NOTE. Train pupils to look thoughtfully at each combination before they attempt to state the sum. Let them then read the sums from left to right.

A.	\$10.00	\$0.10	\$70.00	\$0.70	\$75.00
	10.00	.10	30.00	.30	25.00
B.	\$0.75	\$50.00	\$0.50	\$5.25	\$8.00
	.25	25.00	.25	5.25	3.00
C.	\$300.00	\$30.00	\$3.00	\$0.30	\$0.03
	10.000	10.00	1.00	.10	.01

VII. ADDITION

A.	\$5.00 + 10.00 =	\$32.15 + 32.15 =	\$10.13 + 2.10 =
B.	\$60.00 + 40.00 =	\$80.15 + 20.10 =	\$17.30 + 3.03 =
C.	\$50.00 + 16.18 =	\$50.00 + 50.00 =	\$33.33 + 66.66 =
D.	\$11.22 + 44.33 =	\$61.14 + 17.14 =	\$15.15 + 15.15 =

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VIII. PROBLEMS: AT SCHOOL

1. Look in your various schoolbooks and state where Roman numbers are used.

2. Peter goes to a two-room school in the country. Most of the children are carried to school in automobile trucks. One man receives $12.00 a week for carrying the children by one route and another receives $15.00 a week for carrying them by another route. It costs —— a week to transport these children to and from school.

3. A wall map of the United States is bought for each of the rooms in Peter's school at a cost of $5.10 each. What do the two maps cost? (Do this in two ways. Which is the better way?)

4. It costs $90.00 for coal to heat Peter's schoolhouse in the winter and $10.00 for wood. The expense for heat is then —— a year.

5. The janitor is paid $300.00 a year to care for the school building, and brooms, brushes, and other janitor's supplies cost $25.00. It costs —— to care for the building.

6. If the expense of repairing damages done to the school furniture in Peter's room is $15.00 and to the furniture in the other room is $10.00, the furniture-repair bill for the year is ——.

7. The pupils in Peter's school raised $40.20 by giving entertainments and $8.40 by a candy sale. How large an amount did the children raise for the school?

Additional Work. *Each pupil should write out and bring to class a similar problem of his own.*

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IX. COUNTING

A. Count by 6's to 96.

B. Count by 7's to 98.

X. SUBTRACTION

NOTE. Review pages 86 and 64 before taking this exercise.

A.	\$4.10	\$4.90	\$4.20	\$4.80	\$5.90
	2.00	1.90	3.10	2.40	4.20
B.	\$7.00	\$4.60	\$6.90	\$5.50	\$5.00
	3.00	1.10	2.30	3.00	2.00
C.	\$15.50	\$0.75	\$1.78	\$8.50	\$55.58
	2.20	0.40	0.75	0.25	50.50

XI. SUBTRACTION

A.	\$52.00 − 2.00 =	\$52.00 − 22.00 =	\$75.00 − 25.00 =
B.	\$1.18 − 0.18 =	\$17.60 − 7.40 =	\$30.15 − 15.15 =
C.	\$87.25 − 11.10 =	\$84.14 − 24.04 =	\$39.19 − 35.15 =
D.	\$28.23 − 28.13 =	\$60.40 − 50.20 =	\$41.20 − 20.00 =
E.	\$99.99 − 33.33 =	\$77.77 − 44.44 =	\$70.85 − 60.40 =

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XII. PROBLEMS: AT SCHOOL

1. Paul is asked by his teacher to put 7 sheets of paper on the front desk of each of the 6 rows in his room. How many sheets does he need? (Find this out by counting by 7's and in one other way. Which way is easier?)

2. In Hannah's room the desks are arranged in 7 rows, with 6 seats in a row. If Hannah puts 6 sheets of paper on each front desk for a writing lesson and 6 sheets for an arithmetic lesson, she will need —— sheets. (Find this by counting and in two other ways. Which way do you prefer?)

3. In Hannah's school the paper used costs $22.50 a year. Of this the pupils waste paper to the value of $2.50. What is the value of the paper they use?

4. What is the difference in the cost of a teacher's desk bought for $27.33 and a pupil's desk bought for $5.30?

5. When pupils lose pencils to the value of $0.25 out of a lot costing $6, what is the value of the pencils they actually use?

6. If $84 is paid for coal for your school and only $80 worth is used, what value of coal is left over for next year?

7. In Hannah's school an entertainment is given to raise $35. Only $30 is raised, leaving —— to be raised by gifts.

Additional Work. *Each pupil should write out and bring to class a similar problem of his own.*

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XIII. COUNTING

A. Count by 8's to 96.

B. Count by 9's to 99.

XIV. MULTIPLICATION

NOTE. Review pages 52, 66, and 68 before taking this exercise.

A.	\$9 × 2	\$0.09 × 2	\$6 × 3	\$0.06 × 3	\$6 × 4	\$0.06 × 4
B.	\$12 × 2	\$0.12 × 2	\$11 × 7	\$0.11 × 7	\$10 × 6	\$0.10 × 6
C.	\$8 × 3	\$0.12 × 6	\$0.07 × 7	\$7 × 4	\$11 × 6	\$0.08 × 6

XV. MULTIPLICATION

A.	\$12.00 × 9 =	\$8.00 × 8 =	\$12.00 × 5 =	\$9.00 × 8 =
B.	\$0.09 × 5 =	\$0.08 × 6 =	\$0.08 × 7 =	\$0.09 × 4 =
C.	\$1.11 × 2 =	\$3.30 × 3 =	\$15.00 × 2 =	\$15.15 × 2 =
D.	\$50.00 × 2 =	\$25.25 × 3 =	\$30.20 × 3 =	\$10.11 × 4 =
E.	\$14.14 × 2 =	\$9.09 × 5 =	\$8.08 × 6 =	\$9.10 × 9 =

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XVI. PROBLEMS: AT SCHOOL

1. If a pad of paper costs $0.06 and there are 9 pupils in a class, how much does it cost to supply the class with pads?

2. There are 9 sets of books, in each of which there are 8 books that need rebinding at the end of the year. In all the sets there are —— books that need rebinding. (Do this by counting and in one other way. Which is the better way?)

3. What is the cost of putting new covers on 8 books at $0.11 a book?

4. The janitor puts a new box of crayons in each schoolroom at the beginning of the year. How much does it cost to supply a two-room building at $0.20 a box? (Do this last part in two ways. Which is the easier?)

5. It costs $0.25 to replace a broken pane of glass. How much should boys pay who break 3 panes?

6. Paul has carelessly scratched his desk. It costs $1.10 to repair the damage. If there are 5 careless children in school who damage their desks as Paul did, how much of the taxpayers' money have they wasted?

7. If it costs $7 to buy a set of readers for your class, how much will it cost to supply 6 classes at the same price?

8. John's pencils cost $0.06 each. If he loses 4 of them in a year, how much money has he wasted?

Additional Work. *Each pupil should write out and bring to class a similar problem of his own.*

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XVII. COUNTING

A. Count by 11's to 99.

B. Count by 12's to 96.

XVIII. MULTIPLICATION

A.	\$9 12	\$8 8	\$0.05 12	\$0.08 9	\$0.05 9	\$0.06 8
B.	\$4.00 9	\$7.00 7	\$8.00 8	\$6.00 6	\$5.05 8	\$6.06 9
C.	\$7 10	\$7 20	\$7 30	\$8 40	\$9 100	\$10 10
D.	\$7.07 9	\$4.04 8	\$6.06 11	\$4 70	\$11 11	\$22 40

XIX. MULTIPLICATION

A.	\$12 × 12 =	\$11 × 30 =	\$0.12 × 6 =	\$0.03 × 7 =
B.	\$0.02 × 8 =	\$2.02 × 6 =	\$4.04 × 8 =	\$9 × 3 =
C.	\$9.09 × 11 =	\$60 × 10 =	\$6 × 50 =	\$8.08 × 11 =
D.	\$9.09 × 9 =	\$12 × 50 =	\$11 × 80 =	\$10 × 20 =
E.	\$12 × 9 =	\$12 × 5 =	\$0.09 × 8 =	\$0.09 × 5 =

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XX. PROBLEMS: AT SCHOOL

1. How many 11's do you count if you start with 11 and count to 99? Which is easier, to count by 11's to 99 or to multiply 11 by 9? Try it before you answer.

2. How many pencils are there in a bundle containing a dozen? The teacher sends Charlotte to the supply room to get 8 dozen pencils. Count them for her as she takes each package and state the number of pencils she will have.

3. The school board has decided to put new seats and desks in Charlotte's room. There is room for 40 pupils, and the seats and desks together cost $8 each. The new seats and desks cost ——.

4. New window shades also are put up in Charlotte's room. There are 5 windows, and each shade costs $0.20. It costs —— to supply the shades.

5. The janitress is paid $1 a day to take care of the little country school that Charlotte attends. A school week for the janitress is 6 days. She receives —— a week. For a fortnight she receives ——. Her pay for a month is ——. (Do this last part in three ways and select the easiest way.)

6. Charlotte's teacher is paid $90 a month. How much is that for a school year of 10 months?

7. If the teacher pays $10 a week for board during the school year of 40 weeks, she will pay ——.

Additional Work. *Each pupil should write out and bring to class a similar problem of his own.*

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XXI. READING FRACTIONS

A. $\frac{1}{2}$ $\frac{2}{2}$ $\frac{3}{2}$ $\frac{4}{2}$ $\frac{7}{2}$ $\frac{1}{3}$ $\frac{2}{3}$ $\frac{3}{3}$ $\frac{4}{3}$

B. $\frac{1}{4}$ $\frac{2}{4}$ $\frac{3}{4}$ $\frac{5}{4}$ $\frac{1}{5}$ $\frac{2}{5}$ $\frac{3}{5}$ $\frac{4}{5}$ $\frac{5}{5}$

XXII. DIVISION

NOTE. In this exercise the divisors are abstract. The division separates the dividend into *parts*; that is, the quotient is a certain part (represented by the divisor) of the dividend. Review pages 40, 54, and 70.

A. $2\overline{)\$2}$ $5\overline{)\$5}$ $2\overline{)\$0.02}$ $3\overline{)\$0.03}$ $3\overline{)\$3}$

B. $10\overline{)\$10}$ $10\overline{)\$0.10}$ $2\overline{)\$0.10}$ $20\overline{)\$20}$ $20\overline{)\$0.20}$

C. $9\overline{)\$0.18}$ $7\overline{)\$0.49}$ $8\overline{)\$8.08}$ $5\overline{)\$25.10}$ $6\overline{)\$12.30}$

XXIII. DIVISION

NOTE. In this exercise the divisors are the same kind as the dividends. The quotients are therefore abstract, representing the *number of times* that the divisor is contained in the dividend.

A. $\$2\overline{)\$2}$ $\$5\overline{)\$5}$ $\$6\overline{)\$60}$ $\$12\overline{)\$72}$ $\$0.02\overline{)\$0.02}$

B. $\$11\overline{)\$99}$ $\$0.11\overline{)\$0.99}$ $\$9\overline{)\$36}$ $\$20\overline{)\$40}$ $\$30\overline{)\$60}$

C. $\$0.10\overline{)\$0.20}$ $\$10\overline{)\$20}$ $\$5\overline{)\$50}$ $\$0.05\overline{)\$0.25}$

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XXIV. PROBLEMS: AT SCHOOL

1. Half a dozen pointers have been bought for use at the blackboard in your school at a cost of $0.60. If you break one, how much ought you to pay for it?

2. It may cost $0.75 to put curtains at the three windows of your schoolroom. If one is broken, how much will it cost to replace it?

3. The pencils like those that Paul uses in school cost $0.06 at the store. How many can he buy with $0.06?

4. Paul has $0.18 with which he wants to buy as many pencils like those he uses in school as he can. He can buy —— pencils with his $0.18. (Do this by counting and in one other way. Which way is easier?)

5. $0.99 is paid for blackboard erasers. If each one costs $0.11, how many are bought? (In what two ways can you do this? Which is easier?)

6. If in a four-room building the pupils could save for the taxpayers $16 by avoiding waste, what would the share of saving be for each room? How could the pupils avoid waste? What would the money saved buy that would be useful in your school?

7. At the close of the school year 6 desks in Paul's room are so badly scratched that they are refinished at a cost of $6.60. How much has each of the six careless children cost the taxpayers?

Additional Work. *Each pupil should write out and bring to class a similar problem of his own.*

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XXV. PROBLEMS: MISCELLANEOUS

1. In Jane's and Harry's school it was decided to hold a Christmas sale. At Jane's table $9.30 was received from the sale of candy, and at Harry's table $7.20 was received from the sale of toys. At both tables —— was received.

2. Anna was at the head of the table where boys' neckties were sold. She sold 9 of them at $0.11 each, receiving —— in all for the neckties.

3. Some of the boys fixed up a side show. $0.05 was charged for entrance tickets. Stephen, who was doorkeeper, found that he had taken in 15 nickels. By counting by 5's he found that he had received —— cents in nickels. Could he have found out more quickly in some other way than by counting?

4. Susan sold 20 Christmas cards for which she received $0.40. If they were all sold at the same price, what was charged for each one?

5. The Christmas cards that were sold for $0.40 were purchased at a friendly stationer's for $0.20. So the profit that went into the school funds was ——.

6. When the Christmas sale was over, all the money received was counted. It was found that $25.00 had been taken in at tables and side shows and $10.25 had been taken by the sale of admission tickets. In all that made ——.

Additional Work. *Each pupil should write out and bring to class a similar problem of his own.*

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XXVI. PROBLEMS: MISCELLANEOUS

1. Ink is often bought for schools by the gallon. If $0.80 is paid for a gallon, how much does it cost to fill a quart bottle for Roland's room?

2. Paper is bought by the school committee in packages containing 500 sheets. In 5 packages there are —— sheets.

3. Viola is asked by her teacher to give 2 sheets of paper to each of the 42 pupils in her room. Find out by counting by 2's how many sheets she needs. Find out in an easier way than by counting.

4. If $0.23 is paid for each package of paper in a school, how much has it cost the taxpayers to supply your room with 3 packages?

5. Suppose that in one month the pupils in your school could save $1.00 by being careful in the use of supplies. At the end of the school year of 10 months they will have saved ——.

6. In Harold's school it is decided to buy some playground apparatus. The cost is looked up, and it is found that a football costs $3.10 and that a basket ball costs the same. If one of each is bought the school must raise ——.

7. For baseball 2 bats are needed costing $0.25 each and a ball costing $0.50. How much more must be raised if the school decides to play baseball?

Additional Work. *Each pupil should write out and bring to class a similar problem of his own.*

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GRADE IV. THIRD SERIES

I. READING MIXED NUMBERS

NOTE. When reading mixed numbers the word *and* should be used only between the whole number and the fraction. $101\frac{1}{2}$ is read "one hundred one and one half." See Note, p. 66.

A. $1\frac{1}{2}$	$2\frac{1}{3}$	$3\frac{1}{4}$	$4\frac{1}{5}$	$5\frac{2}{3}$	$6\frac{2}{4}$	$7\frac{3}{4}$
B. $9\frac{3}{5}$	$10\frac{4}{5}$	$15\frac{2}{3}$	$18\frac{2}{4}$	$20\frac{1}{2}$	$50\frac{2}{5}$	$98\frac{1}{3}$

II. FRACTIONAL PARTS

A. $\frac{1}{2}$ of 1 =	$\frac{1}{2}$ of 2 =	$\frac{1}{2}$ of 4 =	$\frac{1}{2}$ of 10 =
B. $\frac{1}{3}$ of 1 =	$\frac{1}{3}$ of 3 =	$\frac{1}{3}$ of 6 =	$\frac{1}{3}$ of 12 =
C. $\frac{1}{4}$ of 1 =	$\frac{1}{4}$ of 4 =	$\frac{1}{4}$ of 8 =	$\frac{1}{4}$ of 16 =
D. $\frac{1}{3}$ of 9 =	$\frac{1}{2}$ of 14 =	$\frac{1}{4}$ of 12 =	$\frac{1}{3}$ of 15 =

III. FRACTIONAL PARTS

A. $\frac{1}{4}$ of 20 =	$\frac{1}{4}$ of 24 =	$\frac{1}{4}$ of 28 =	$\frac{1}{4}$ of 36 =
B. $\frac{1}{3}$ of 24 =	$\frac{1}{3}$ of 30 =	$\frac{1}{3}$ of 36 =	$\frac{1}{3}$ of 60 =
C. $\frac{1}{2}$ of 40 =	$\frac{1}{2}$ of 50 =	$\frac{1}{2}$ of 80 =	$\frac{1}{2}$ of 100 =
D. $\frac{1}{2}$ of 60 =	$\frac{1}{3}$ of 75 =	$\frac{1}{4}$ of 88 =	$\frac{1}{4}$ of 100 =

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IV. PROBLEMS: AT THE NEWSDEALER'S STORE

1. Harold is a newsboy who buys his papers of Mr. Carlton at No. 7014 Main Street. Harold pays $1\frac{1}{2}\phi$ for some papers and $1\frac{1}{4}\phi$ for others. He wears a badge that has the number 82 on it. Read the numbers correctly.

2. One day Harold bought 30 papers, but only sold $\frac{1}{3}$ of them. Then he sold —— papers.

3. Mr. Carlton put 3 dozen bottles of ink on his shelf and sold $\frac{1}{4}$ of them in a week. How many ink bottles did he sell in a week?

4. If there are 4 jars of candy on the shelf and $\frac{1}{4}$ is broken, there are —— jars remaining on the shelf.

5. Mr. Carlton buys 100 papers every night, but sells only $\frac{1}{2}$ of them in the store, selling the rest through newsboys. Then he sells —— papers in the store, and the newsboys sell —— papers.

6. If Mr. Carlton tells Harold to put the 4 dozen magazines on 4 shelves, an equal number on each shelf, he should put —— magazines on each shelf. (The answer may be given in two ways.)

7. Every week Harold sells 22 *Saturday Evening Posts*. Of these he delivers $\frac{1}{2}$ at the homes of regular subscribers and the rest he sells on the street. Then he has —— regular customers.

Additional Work. *Each pupil should write out and bring to class a similar problem of his own.*

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V. COUNTING BY FRACTIONS

NOTE. This and similar exercises will familiarize pupils with the names, sequence, and relative value of fractions. The pupils will say, "$\frac{1}{2}$, $\frac{2}{2}$ or 1; $\frac{3}{2}$, $\frac{4}{2}$ or 2;" etc.

A. Count by halves to 10.

B. Count by thirds to 10.

VI. MEASURES OF LENGTH

A.	1 ft. = ? in.	2 ft. = ? in.	3 ft. = ? in.
B.	$\frac{1}{2}$ ft. = ? in.	$\frac{1}{4}$ ft. = ? in.	$\frac{1}{3}$ ft. = ? in.
C.	1 yd. = ? ft.	2 yd. = ? ft.	5 yd. = ? ft.
D.	1 yd. = ? in.	$\frac{1}{2}$ yd. = ? in.	$\frac{1}{4}$ yd. = ? in.
E.	$1\frac{1}{2}$ ft. = ? in.	$1\frac{1}{4}$ ft. = ? in.	$1\frac{1}{3}$ ft. = ? in.

VII. MEASURES OF LENGTH

A.	12 in. = ? ft.	18 in. = ? ft.	24 in. = ? ft.
B.	3 ft. = ? yd.	6 ft. = ? yd.	9 ft. = ? yd.
C.	36 in. = ? yd.	18 in. = ? yd.	9 in. = ? yd.
D.	24 in. = ? ft.	36 in. = ? ft.	18 in. = ? ft.
E.	? in. = $\frac{1}{2}$ yd.	? ft. = $\frac{1}{2}$ yd.	? in. = $\frac{1}{4}$ yd.

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VIII. PROBLEMS: AT THE DRY-GOODS STORE

1. The clerk behind the ribbon counter is cutting a long piece of ribbon in half-yard lengths. After she has cut 8 such lengths, she has used —— yards of ribbon. (Find the number of yards by counting by half-yards.)

2. If the clerk cut the ribbon into 12-inch lengths, how many yards would she use in cutting 3 lengths? (Find this answer in three ways and choose the easiest way.)

3. The clerk at another counter sells $1\frac{1}{4}$ yards of silk. How many inches more than a yard is that?

4. A tape measure is generally 60 inches long. One half of it is how many inches long?

5. A piece of cloth is 24 inches in width. How many feet wide is it?

6. If a piece of cloth is $\frac{1}{4}$ yard wide, how many inches wide is it?

7. If a boy wears a 13-inch collar, what will it measure in feet and inches?

8. Anna buys enough ribbon to make a bow 2 feet long. How many inches does the clerk measure off? How many inches less than a yard does Anna buy? What part of a yard is left?

Additional Work. *Each pupil should write out and bring to class a similar problem of his own.*

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IX. COUNTING BY FRACTIONS

A. Count by fourths to 10.

B. Count by fifths to 10.

X. MEASURES OF AREA

A. 1 sq. ft. = ? sq. in. 2 sq. ft. = ? sq. in.

B. $\frac{1}{2}$ sq. ft. = ? sq. in. $\frac{1}{4}$ sq. ft. = ? sq. in.

C. 1 sq. yd. = ? sq. ft. 2 sq. yd. = ? sq. ft.

D. 3 sq. yd. = ? sq. ft. 5 sq. yd. = ? sq. ft.

E. 10 sq. yd. = ? sq. ft. 20 sq. yd. = ? sq. ft.

XI. MEASURES OF AREA

A. 144 sq. in. = ? sq. ft. 288 sq. in. = ? sq. ft.

B. 72 sq. in. = ? sq. ft. 36 sq. in. = ? sq. ft.

C. 9 sq. ft. = ? sq. yd. 18 sq. ft. = ? sq. yd.

D. 36 sq. ft. = ? sq. yd. 90 sq. ft. = ? sq. yd.

E. How many inches around (perimeter) 1 sq. in.?

F. How many feet around 1 sq. ft.?

G. How many yards around 1 sq. yd.?

H. How many feet around 1 sq. yd.?

I. How many inches around 1 sq. ft.?

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XII. PROBLEMS: AT A HARDWARE STORE

1. The hardware dealer sells and uses foot-rule measures. Take your ruler and count by fourth (or quarter) inches to the 3-inch division line. How many quarter inches are there? What is an easier way of finding the number of quarter inches in 3 inches?

2. Stephen goes to the hardware store and asks for a square yard of mosquito netting. How many yards long will it be? How many yards wide?

3. If the dealer uses a foot rule to measure the netting for Stephen, how many feet will he measure off for the length and the width?

4. How many square feet will Stephen's netting contain?

5. What is the perimeter of Stephen's netting in yards? in feet? (Find the perimeter in two ways. Which is the easier way?)

6. One day Stephen breaks a pane of window glass. He measures the old glass and finds that it measures 12 inches in length and 12 inches in width. He must pay for the area of glass he needs. How many square inches must he buy? This is how many square feet?

7. Stephen must also buy putty to fasten the glass in place. How many inches in length must he apply the putty? How many feet?

Additional Work. *Each pupil should write out and bring to class a similar problem of his own.*

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XIII. MEASURES OF SOLIDS

A. 1 cu. ft. = ? cu. in. 1 cu. yd. = ? cu. ft.

B. How long is a cu. ft.? a cu. yd.?

C. How wide is a cu. ft.? a cu. yd.?

D. How high is a cu. ft.? a cu. yd.?

XIV. MEASURES OF LIQUID

A.	1 pt. = ? gi.	2 pt. = ? gi.	3 pt. = ? gi.
B.	4 pt. = ? gi.	1 qt. = ? pt.	2 qt. = ? pt.
C.	1 gal. = ? qt.	2 gal. = ? qt.	10 gal. = ? qt.
D.	2 gi. = ? pt.	1 gi. = ? pt.	3 gi. = ? pt.
E.	2 pt. = ? qt.	1 pt. = ? qt.	3 pt. = ? qt.
F.	4 pt. = ? qt.	4 qt. = ? gal.	1 qt. = ? gal.

XV. MEASURES OF DRY SUBSTANCES

A.	2 pt. = ? qt.	4 pt. = ? qt.	3 pt. = ? qt.
B.	8 qt. = ? pk.	4 qt. = ? pk.	16 qt. = ? pk.
C.	4 pk. = ? bu.	8 pk. = ? bu.	2 pk. = ? bu.
D.	$\frac{1}{2}$ bu. = ? qt.	$\frac{1}{2}$ bu. = ? pk.	$\frac{1}{2}$ pk. = ? qt.
E.	$1\frac{1}{2}$ bu. = ? pk.	$1\frac{1}{2}$ pk. = ? qt.	3 pk. = ? qt.
F.	2 bu. = ? pk.	2 bu. = ? qt.	10 bu. = ? pk.

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XVI. PROBLEMS: AT THE PROVISION STORE

1. In Mr. Harper's provision store there is a big block of wood on which he chops his meat. It measures 3 feet across one way, 3 feet across the other way, and is 3 feet thick. How large would you say this block is? (The answer may be given in two ways.)

2. On a shelf that is 12 inches wide Mr. Harper wants to put a box that he finds measures a cubic foot. How far apart must the shelves be and how much space on the shelf will the box take?

3. Mr. Harper buys a bushel of green peas from a farmer, but he sells them by the quart. How many quarts can he sell from the bushel?

4. A barrel of apples is $2\frac{1}{2}$ bushels. How many pecks should Mr. Harper be able to sell out of the barrel?

5. Vinegar is bought by Mr. Harper in a keg holding 10 gallons. If his customers buy vinegar by the quart, he can draw off —— quarts from his keg.

6. Mr. Harper has 20 customers that buy a quart of milk a day in glass jars. How many gallons of milk does that amount to?

7. Out of a box containing a bushel of potatoes Mr. Harper sells a peck. Then —— pecks remain in the box.

Additional Work. *Each pupil should write out and bring to class a similar problem of his own.*

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XVII. MEASURES OF WEIGHT

A.	1 lb. = ? oz.	$\frac{1}{2}$ lb. = ? oz.	$\frac{1}{4}$ lb. = ? oz.
B.	1 T. = ? lb.	$\frac{1}{2}$ T. = ? lb.	2 T. = ? lb.
C.	16 oz. = ? lb.	8 oz. = ? lb.	4 oz. = ? lb.
D.	2000 lb. = ? T.	1000 lb. = ? T.	3000 lb. = ? T.

XVIII. MEASURES OF TIME

A.	1 min. = ? sec.	$\frac{1}{2}$ min. = ? sec.	$\frac{1}{4}$ min. = ? sec.
B.	1 hr. = ? min.	$\frac{1}{2}$ hr. = ? min.	$\frac{1}{4}$ hr. = ? min.
C.	$1\frac{1}{2}$ hr. = ? min.	1 da. = ? hr.	2 da. = ? hr.
D.	$\frac{1}{2}$ da. = ? hr.	1 wk. = ? da.	2 wk. = ? da.
E.	1 yr. = ? da.	1 yr. = ? wk.	1 yr. = ? mo.

XIX. MEASURES OF TIME

A.	60 sec. = ? min.	30 sec. = ? min.	15 sec. = ? min.
B.	60 min. = ? hr.	90 min. = ? hr.	30 min. = ? hr.
C.	15 min. = ? hr.	24 hr. = ? da.	12 hr. = ? da.
D.	48 hr. = ? da.	7 da. = ? wk.	4 wk. = ? mo.
E.	365 da. = ? yr.	6 mo. = ? yr.	52 wk. = ? yr.

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XX. PROBLEMS: AT THE BAKESHOP

1. Anna buys a large loaf of bread (1-pound loaf) at the baker's. How many ounces of bread does she buy?

2. The baker buys a ton of flour. If he bakes it into bread, putting a pound of flour into each loaf, he will bake —— loaves.

3. If the baker makes another ton of flour into loaves containing half as much flour, he will make —— small loaves.

4. Each kind of food the baker makes requires a particular length of time for baking. If it takes $\frac{3}{4}$ hour to bake bread, how many minutes does it require?

5. But to make good bread it must be "raised." This requires about $\frac{1}{2}$ day, or —— hours.

6. One man has worked for Mr. Harris, the baker, a whole year without one day off. How many days has he worked?

7. If a man takes 1 day off each week, he works —— days in the year.

8. A working day is one third of a whole day. How many hours a day does a man work?

9. If the clerk in the bakeshop has $\frac{1}{2}$ hour for lunch at noon, he is away from the store —— minutes.

Additional Work. *Each pupil should write out and bring to class a similar problem of his own.*

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XXI. COUNTING

A. 1 doz. = ? units 2 doz. = ? units 3 doz. = ? units

B. $\frac{1}{2}$ doz. = ? units $\frac{1}{4}$ doz. = ? units $\frac{1}{3}$ doz. = ? units

C. 1 gro. = ? doz. 1 gro. = ? units $\frac{1}{2}$ gro. = ? doz.

D. 12 units = ? doz. 18 units = ? doz. 6 units = ? doz.

E. 4 units = ? doz. 24 units = ? doz. 3 units = ? doz.

F. 12 doz. = ? gro. 144 units = ? gro. 6 doz. = ? gro.

XXII. MEASURES OF PAPER

A. 1 quire = ? sheets $\frac{1}{2}$ quire = ? sheets $\frac{1}{4}$ quire = ? sheets

B. 1 ream = ? sheets 2 reams = ? sheets $\frac{1}{2}$ ream = ? sheets

C. 24 sheets = ? quires 6 sheets = ? quires
36 sheets = ? quires

D. 500 sheets = ? reams 250 sheets = ? reams
1000 sheets = ? reams

XXIII. MEASURES OF UNITED STATES MONEY

A. 1 ct. = ? mills 2 ct. = ? mills $\frac{1}{2}$ ct. = ? mills

B. 1 d. = ? ¢ 5 d. = ? ¢ 8 d. = ? ¢

C. 10 d. = ? ct. \$1.00 = ? ¢ \$$\frac{1}{2}$ = ? ct.

D. \$$\frac{1}{4}$ = ? ¢ \$1.00 = ? d. \$$\frac{1}{2}$ = ? d.

E. 10 mills = ? ct. 5 mills = ? ct. 10¢ = ? d.

F. 5¢ = ? d. 100¢ = ? \$ 50¢ = ? \$? d.

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XXIV. PROBLEMS: AT THE STATIONERY STORE

1. Mr. Morris keeps a stationery store. He buys pencils by the gross. If he buys two gross of Faber's pencils, how many pencils does he buy? How many dozen pencils?

2. Arthur buys half a dozen pencils. Mr. Morris counts out —— pencils from a package containing 1 dozen.

3. If Mr. Morris buys 1 gross of small ink bottles and sells 6 dozen of them, he has —— dozen left, or —— bottles.

4. Mr. Morris opens a package of paper containing a ream and sells half of it. He should have —— sheets remaining in the package.

5. A customer buys 2 quires of paper. How many envelopes will he need if he plans to put only one sheet in each envelope? (Envelopes generally are sold in packages. How many are there in a package?)

6. Arthur gives Mr. Morris a dime when he buys a 5¢ pencil. He should receive ——¢ in change.

7. If Mr. Morris sells 10 paper napkins for 1¢, each costs —— mills. You can buy —— napkins for a dime.

8. Arthur receives 5 dimes as change one day when he buys some stationery for his mother. How many cents might Mr. Morris have given him?

9. If Arthur had received his change, amounting to 5 dimes, in one piece of money, he would have received —— dollar.

Additional Work. *Each pupil should write out and bring to class a similar problem of his own.*

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XXV. PROBLEMS: MISCELLANEOUS

1. Alan went to the grocery store and bought $\frac{1}{2}$ dozen eggs and $\frac{1}{2}$ pound of butter. How many eggs did the grocer count out for him and how many ounces of butter did he weigh out on the scales?

2. The fruit man sells 2 apples for 1¢. That is at the rate of one apple for ——¢, or —— mills.

3. If you buy 2 reams of paper how many sheets will you buy?

4. The owner of a candy store buys of the wholesale dealer a box of candy containing 100 pieces. The pieces are packed in 5 layers. There must then be —— pieces in each layer.

5. Mother asks Gertrude to take the tape measure and measure off 2 yards of a piece of cotton cloth that she has bought. How many inches does she measure off?

6. Chester is sent to the hardware store to buy a piece of zinc to put under his mother's stove. It is to be a square yard in size. What will it measure on the four sides?

7. Suppose you are a clerk in a bakeshop. Count out 3 dozen doughnuts by 2's; by 3's; by 4's.

8. Chester buys at the hardware store 5 screws for 1¢. That is at the rate of 1 screw for —— mills.

9. Chester pays 20¢ for some ribbon for his sister and gives the clerk $1.00. His change is all in dimes. How many does he receive?

Additional Work. *Each pupil should write out and bring to class a similar problem of his own.*

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XXVI. PROBLEMS: MISCELLANEOUS

1. Viola goes to the grocery store and buys cream in a small bottle holding one-half pint. How many gills of cream does she buy?

2. The grocer has in his refrigerator 20 pint bottles of milk. How many quarts does that make?

3. If he has 2 gallons of milk in a can, he can sell from it —— quarts.

4. The provision dealer has a box containing a bushel of potatoes. He sells Arthur a peck. He has —— pecks left in the box. How many quarts of potatoes are left? (Do this in two ways and decide which is the easier way.)

5. The provision dealer has an ice box that measures inside 3 feet in length, 3 feet in width, and 3 feet in depth. How many cubic yards of ice will it contain? How many cubic feet of ice?

6. Mr. Harris, the market man, has 500 pounds of ice put in his refrigerator every week. In how many weeks does he use 1 ton of ice?

7. Viola happened to be in a jeweler's shop when the jeweler was setting a watch that was a little slow. He sets it forward one-half minute, or —— seconds.

8. The clerk in the bakeshop has a two weeks' vacation in summer. That is —— month, or —— days.

9. If John, the provision clerk, works 10 hours a day, that leaves him —— hours for himself.

Additional Work. *Each pupil should write out and bring to class a similar problem of his own.*

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GRADE IV. FOURTH SERIES

I. TWO PROCESSES

A. $2+4-1=$ $18-10+9=$ $16-9+7=$ $6+9-7=$

B. $18-8+7=$ $5+8-6=$ $15-7+6=$ $13-7+7=$

II. ADDITION

NOTE. Have pupils note the numbers that *in sequence* make 10 *before* they begin to add. This should become a habit in all addition. Encourage adding other combinations also; that is, 3 + 1, 2 + 1, 2 + 2, 3 + 2, etc.

A.	5	7	9	3	2	3	3	0	2
	5	3	0	3	7	7	4	4	8
	0	1	1	3	1	5	3	4	0
	5	0	6	1	5	5	1	2	5
B.	6	6	1	2	7	7	1	5	5
	3	3	7	5	8	4	3	2	4
	1	1	3	5	2	6	7	8	1
	0	8	4	3	7	3	3	2	7

III. ADDITION

A.	2	7	9	2	5	7	6	5	4
	8	3	5	3	7	1	2	1	4
	3	6	3	8	3	1	1	2	2
	9	4	2	2	5	1	1	2	2
B.	3	6	1	2	2	5	6	7	9
	3	4	9	2	7	0	6	8	6
	7	6	7	2	1	8	6	5	7
	3	8	2	4	4	2	4	5	3

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IV. PROBLEMS OF THE CONDUCTOR

1. The conductor on a street car or a railroad train is obliged to do a great many examples. In one freight train there are 3 box cars, 4 platform cars, 6 tank cars, and 1 caboose. The conductor reports —— cars in his train.

2. Hilda rode from New York to Chicago in a train consisting of (besides the engine) 1 baggage car, 1 smoking car, 4 parlor cars, and 6 coaches. The engine drew —— cars in this train.

3. Nelson was riding on a train that made four stops. How many people got off if 8 people stopped at the first station, 2 at the second, none at the third, and 5 at the fourth?

4. At one stop a number of people get on a street car. After the car has started, the conductor finds that he has received 4 tickets, 3 cash fares, 3 transfers, besides 7 passes from policemen and others who ride without paying fares. Then —— people got on at that stop.

5. A motorman makes 4 trips a day, each trip taking 3 hours. How long does he work each day? (Do this in two ways, selecting the easier way.)

6. A conductor is obliged to stop his train four times during one trip. At the first stop he loses 3 minutes, at the second 7 minutes, at the third 7 minutes, and at the fourth 3 minutes. How late is his train at the end of the trip?

Additional Work. *Each pupil should write out and bring to class a similar problem of his own.*

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V. TWO PROCESSES

A.	$3+9-5=$	$17-8+9=$	$15-7+3=$	$16-8+8=$
B.	$4+8-7=$	$15-8+3=$	$21-7-7=$	$4+6+10=$
C.	$12-7+6=$	$11-8+5=$	$14-2+7=$	$7+7+2=$

VI. ADDITION

A.	2	5	7	8	4	6	7	2	3
	7	3	1	2	5	3	2	0	4
	1	2	0	6	0	4	7	5	3
	4	6	9	4	5	6	3	6	7
	3	4	1	0	5	3	4	4	0
B.	4	3	2	5	6	8	7	3	2
	4	6	3	7	0	1	2	3	2
	2	4	3	3	1	1	1	3	3
	8	0	2	8	8	4	1	1	3
	7	5	5	2	2	5	4	3	9

VII. ADDITION

A.	4	5	9	6	0	5	7	2	5
	6	0	1	4	3	2	0	6	2
	4	8	5	4	7	8	7	2	6
	5	1	5	0	1	5	3	0	4
	5	1	0	6	9	5	7	7	0
B.	8	7	2	1	4	3	9	6	5
	9	9	3	1	6	7	6	3	0
	2	4	1	1	9	8	4	7	7
	8	6	4	2	3	5	6	0	7
	7	8	6	8	7	5	4	8	3

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VIII. PROBLEMS OF THE POST OFFICE

1. If Mr. Casey, the letter carrier, has a bundle containing 14 letters and delivers 2 letters at one house and 2 at another, he has —— letters left to deliver. (Do this in two ways and select the easier way.)

2. The postmaster has in his stamp drawer 21 two-cent stamps. He sells 11 of them, but later puts 5 more in the drawer. There are then in the drawer —— two-cent stamps.

3. Five people buy two-cent stamps at the post office. How many have they bought when the first has purchased 5 stamps, the second 5, the third 2, the fourth 3, and the fifth 5?

4. At different times during the day mail bags come to the office with letters and papers from different parts of this country. If 4, 4, 2, 7, and 3 bags are brought at different times during the day, the office receives in all —— bags.

5. On one trip the letter carrier delivered 3 parcel-post packages at one house, 1 package at another, and 3 packages to each of three other places. In all he delivered on that trip —— parcel-post packages. (Do this in two ways and select the easier way.)

6. In a large city there are five branch post offices. There are 5, 5, 6, 3, and 7 carriers connected with the several offices. This city has —— letter carriers.

Additional Work. *Each pupil should write out and bring to class a similar problem of his own.*

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IX. TWO PROCESSES

NOTE. In this and all similar exercises have pupils perform the multiplication and division processes before the addition and subtraction; otherwise perform the operations in the order of their occurrence.

A.	$6 \div 2 + 1 =$	$8 \div 2 + 2 =$	$8 + 2 \div 2 =$	$4 + 9 \div 3 =$
B.	$12 \div 4 - 2 =$	$70 \div 10 - 5 =$	$18 - 8 \div 2 =$	$24 - 7 \div 7 =$
C.	$25 + 6 \div 3 =$	$27 - 9 \div 3 =$	$15 \div 5 + 3 =$	$27 \div 9 - 2 =$

X. MAKING CHANGE

NOTE. Pupils should make change as storekeepers do, by adding to the amount of the purchase enough to equal the amount given by the purchaser. That is, if \$0.25 is given for a \$0.03 purchase, the storekeeper will say, "\$0.03 and \$0.02 are \$0.05; \$0.05 and \$0.10 are \$0.15, and \$0.10 are \$0.25."

Pupils should be given freedom to make any practical combinations.

In the following the lower number represents amount of sale:

A.	\$0.10	\$0.25	\$0.20	\$0.35	\$0.30	\$0.50	\$0.50
	0.02	0.17	0.16	0.26	0.21	0.30	\$0.12
B.	\$0.25	\$0.25	\$0.25	\$0.45	\$0.45	\$0.35	\$0.25
	0.08	0.18	0.06	0.37	0.39	0.29	0.12

XI. MAKING CHANGE

A.	\$0.50	\$0.60	\$0.75	\$0.85	\$0.90	\$0.95	\$1.00
	0.25	0.51	0.50	0.79	0.81	0.86	0.50
B.	\$0.50	\$0.50	\$0.75	\$0.70	\$0.50	\$0.65	\$1.00
	0.17	0.28	0.60	0.61	0.35	0.58	0.65

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XII. PROBLEMS OF THE FRUIT SELLER

1. Mr. Rossi keeps a fruit stand. In a box there are 25 oranges. He puts 5 more with them and then divides them into three equal lots of —— oranges each.

2. If the fruit dealer has 24 boxes of grapes, sells 4 boxes, and divides the rest into two lots, one of which he puts in a dark room, how many boxes does he leave on sale?

3. Clara buys a banana for $0.02 and gives $0.10 in payment. Find her change.

4. What change does Mr. Rossi return to Tony, who gives him $0.25 for a $0.03 orange?

5. A customer buys a dozen lemons costing $0.36. Count out his change for $1.00.

6. If $0.50 is given in payment for grapes costing $0.15, what is the change?

7. Rosa buys of Mr. Rossi a pound of dates for $0.12. What change does she receive if she gives him $0.20?

8. What change does Mr. Rossi give a customer who gives him $0.75 for fruit costing $0.52?

9. Mr. Rossi has 90 grapefruit that he arranges in his show window in three piles of equal size. He sells 6 grapefruit from one pile. How many are left in that pile?

Additional Work. *Each pupil should write out and bring to class a similar problem of his own.*

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XIII. TWO PROCESSES

A.	$3+2\times2=$	$4-1\times3=$	$4\times10-5=$	$8\div4\times6=$
B.	$7-8\div2=$	$4\div4\times6=$	$12\div4+2=$	$5\times5+2=$
C.	$6\div3+2=$	$3\times4\times2=$	$39\div13-2=$	$16-4\div4=$
D.	$8\times5\div4=$	$42\div6\times5=$	$10+6\times3=$	$4-20\div5=$

XIV. MULTIPLICATION

A.	\$0.03	\$0.05	\$0.06	\$0.04	\$0.05	\$0.04
	6	11	6	11	8	6
B.	\$0.07	\$0.05	\$0.06	\$0.03	\$0.08	\$0.05
	11	6	11	8	11	9
C.	\$0.03	\$0.05	\$0.09	\$0.03	\$0.04	\$0.10
	9	7	11	12	8	10
D.	\$0.04	\$0.09	\$0.07	\$0.05	\$0.06	\$0.04
	12	9	7	12	7	9

XV. MULTIPLICATION

A.	$\$0.06\times8=$	$\$0.06\times12=$	$\$0.08\times8=$	$\$0.06\times9=$
B.	$\$0.09\times12=$	$\$0.08\times9=$	$\$0.12\times12=$	$\$0.07\times8=$
C.	$\$0.07\times12=$	$\$0.07\times9=$	$\$0.08\times12=$	$\$0.10\times12=$
D.	$\$0.10\times11=$	$\$0.11\times12=$	$\$0.11\times11=$	$\$0.09\times8=$
E.	$\$0.12\times11=$	$\$0.11\times10=$	$\$0.12\times10=$	$\$0.09\times7=$

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XVI. PROBLEMS OF THE DAIRY

1. If Mr. Jones has 4 cows, each of which gives 12 quarts of milk a day, how many gallons of milk do they give? (This may be done in two ways. Which is the easier?)

2. If one of Mr. Jones's cows gives 13 quarts of milk a day, and he keeps 3 quarts for family use, how many customers can he supply with 2 quarts each?

3. Mr. Jones feeds daily 5 quarts of skim milk to each of 3 pigs. In 10 days the pigs will drink —— quarts.

4. If a milkman sells cream for $0.20 a half pint, how much will Mrs. Mathews pay him if she buys half a pint each week for a month?

5. If milk is $0.09 a pint, how much is it a quart? a gallon? (The last part may be done in two ways.)

6. Mr. Jones sells milk to a milkman for $0.06 a quart in large cans containing 9 quarts. How much does he receive per large can?

7. If a farmer pays to an expressman $0.04 a can to take his milk to the railroad station, where it is shipped to the city, it will cost him —— to send 11 cans.

8. Mr. Jones puts up some of his milk in quart bottles. If each bottle costs $0.05, he will pay —— for a dozen bottles. If one of the dozen is broken and he buys an extra bottle to take its place, he will pay —— for bottles.

Additional Work. *Each pupil should write out and bring to class a similar problem of his own.*

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XVII. FRACTIONAL PARTS WITH REMAINDERS

NOTE. Pupils may state the remainders as whole numbers or as fractions, as the teacher may direct; that is, $\frac{1}{2}$ of 5 = 2 and 1 over, or $2\frac{1}{2}$.

A. $\frac{1}{2}$ of 3 = $\frac{1}{2}$ of 7 = $\frac{1}{2}$ of 9 = $\frac{1}{2}$ of 11 =

B. $\frac{1}{3}$ of 4 = $\frac{1}{3}$ of 7 = $\frac{1}{3}$ of 10 = $\frac{1}{3}$ of 13 =

C. $\frac{1}{4}$ of 5 = $\frac{1}{4}$ of 9 = $\frac{1}{4}$ of 13 = $\frac{1}{4}$ of 17 =

XVIII. DIVISION WITH REMAINDERS

NOTE. Have pupils state the *nearest* number of times the divisor is contained in the dividend, ignoring the exact remainder. This will give practice in finding trial divisors. Additional practice may be given with similar examples put on the board.

A. $12\overline{)13}$ $12\overline{)25}$ $12\overline{)40}$ $10\overline{)87}$ $15\overline{)35}$ $20\overline{)41}$

B. $25\overline{)60}$ $21\overline{)43}$ $14\overline{)30}$ $11\overline{)40}$ $11\overline{)78}$ $13\overline{)43}$

C. $33\overline{)77}$ $25\overline{)60}$ $30\overline{)70}$ $40\overline{)90}$ $20\overline{)50}$ $60\overline{)130}$

XIX. DIVISION WITH REMAINDERS

A. $11\overline{)109}$ $11\overline{)105}$ $20\overline{)130}$ $12\overline{)100}$ $9\overline{)65}$

B. $27\overline{)50}$ $11\overline{)100}$ $32\overline{)50}$ $45\overline{)80}$ $23\overline{)37}$

C. $28\overline{)60}$ $26\overline{)49}$ $52\overline{)90}$ $58\overline{)100}$ $44\overline{)89}$

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XX. PROBLEMS OF THE CARPENTER

1. A carpenter often uses a two-foot rule. It is sometimes divided into four parts, joined together by hinges. When the carpenter folds this measure once there are —— inches in each of the two parts.

2. When the carpenter folds his two-foot measure twice, each of the four parts is —— inches long. (This may be done in two ways.)

3. Nelson has a stick 15 inches long. He wants to cut off pieces 4 inches long. How many such pieces can he cut from his stick? (This can be done in two ways. Which is the quicker way?)

4. Nelson has a stick 37 inches long. How can he use it for a yardstick? (This can be done in two ways.)

5. From a stick 1 inch wide and 11 inches long how many pieces containing 2 square inches can be cut?

6. Mr. Harris, the carpenter, needs 6 screws for each of 8 pairs of hinges that he is putting on some doors. He finds that he has 45 screws. Is that enough? (You can do this in three ways. Select the easiest way.)

7. Mr. Harris works 44 hours in a week. How many full days of 8 hours each does he work?

8. A package of screws contains a gross, but one screw is lost from a package. How many sets of screws of 1 dozen in each set can be made up from this package?

Additional Work. *Each pupil should write out and bring to class a similar problem of his own.*

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XXI. FRACTIONAL PARTS WITH REMAINDERS

A. $\frac{1}{2}$ of \$0.13 = $\frac{1}{2}$ of \$0.15 = $\frac{1}{2}$ of \$0.17 = $\frac{1}{2}$ of 19 in. =

B. $\frac{1}{3}$ of 22 ft. = $\frac{1}{3}$ of 25 mi. = $\frac{1}{3}$ of 14 pt. = $\frac{1}{3}$ of 28 gal. =

C. $\frac{1}{3}$ of 13 oz. = $\frac{1}{4}$ of 25 lb. = $\frac{1}{4}$ of 7 da. = $\frac{1}{4}$ of 29 yr. =

XXII. DIVISION WITH REMAINDERS

A. $13\overline{)\$27}$ $14\overline{)\$29}$ $15\overline{)\$35}$ $19\overline{)\$39}$ $18\overline{)\$30}$

B. $\$21\overline{)\$40}$ $\$22\overline{)\$50}$ $\$25\overline{)\$76}$ $\$30\overline{)\$70}$ $\$40\overline{)\$90}$

C. $12\overline{)40 \text{ in.}}$ $15\overline{)33 \text{ in.}}$ $20\overline{)45 \text{ ft.}}$ $50\overline{)75 \text{ yd.}}$ $80\overline{)170 \text{ mi.}}$

D. $8 \text{ oz.}\overline{)25 \text{ oz.}}$ $11 \text{ lb.}\overline{)23 \text{ lb.}}$ $15 \text{ sec.}\overline{)33 \text{ sec.}}$ $14 \text{ da.}\overline{)26 \text{ da.}}$

XXIII. DIVISION WITH REMAINDERS

A. $16\overline{)28 \text{ qt.}}$ $18\overline{)30 \text{ qt.}}$ $21\overline{)50 \text{ pt.}}$ $33\overline{)67 \text{ gi.}}$ $19\overline{)40 \text{ gal.}}$

B. $22 \text{ qt.}\overline{)41 \text{ qt.}}$ $33 \text{ gi.}\overline{)65 \text{ gi.}}$ $11 \text{ gi.}\overline{)75 \text{ gi.}}$ $50 \text{ pt.}\overline{)99 \text{ pt.}}$

C. $4\overline{)17 \text{ doz.}}$ $14\overline{)27 \text{ doz.}}$ $17\overline{)30 \text{ gr.}}$ $44\overline{)90 \text{ quires}}$

D. $24 \text{ doz.}\overline{)55 \text{ doz.}}$ $39 \text{ gr.}\overline{)77 \text{ gr.}}$ $44\overline{)90 \text{ quires}}$

E. $60\overline{)500 \text{ sheets}}$ $60 \text{ sheets}\overline{)500 \text{ sheets}}$

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XXIV. PROBLEMS OF THE FARMER

1. Mr. Wilbur is a farmer living 13 miles from a large city. About $\frac{1}{3}$ of the way to the city is the nearest village, which is therefore about —— miles from Mr. Wilbur's home.

2. If Mr. Wilbur's hens lay 50 eggs in one day he has —— full dozen to sell.

3. If at another time Mr. Wilbur receives from a peddler $1.50 for eggs that are selling for $0.60 a dozen, he must have sold more than —— dozen.

4. In a large can Mr. Wilbur has 21 quarts of milk. He pours it into two-quart bottles. He fills —— bottles and has —— quart, or —— bottle left over.

5. If Mr. Wilbur churns 17 pounds of butter and puts it into 5-pound boxes, he has —— boxes of butter.

6. In the month of June there are —— days. This is —— weeks and —— days.

7. In Mr. Wilbur's barn the place where the cows stand (the stanchions) is 43 feet long. If it is divided up so that each cow has 4 feet of space in which to stand, he can put —— cows in the stanchions.

8. Mr. Wilbur weighs out 19 pounds of corn meal. He makes it into a mash for his hens and chickens. He has 4 pens of hens. To each pen he gives the same amount of mash, and the rest he gives to his chickens. Then he gives —— pounds to each pen of hens and —— pounds to his chickens.

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XXV. PROBLEMS: MISCELLANEOUS

1. Mr. Sands drives an ice wagon. During July he worked 26 days. How many days did he "take off" in July?

2. One cake of ice weighs 25 pounds, but Mrs. Howe wants only 15 pounds, so Mr. Sands must cut off —— pounds.

3. Harry lives on a farm. One day he opens a new 2-bushel bag of corn. How many quarts were in the bag? (Do this in two ways.)

4. Harry pours $\frac{1}{2}$ the bag of corn into a box. How many feedings will this be for the horse if he gives the horse 4 quarts at a time?

5. Sam buys 2 balls of twine, each containing 150 feet. He ties the two balls together for a kite string. His string is then —— feet long. (Do this in two ways.)

6. Three boys are playing ball in the school yard. The ball accidentally breaks a window that costs $0.75 to replace. Each boy should pay ——. (Do this in two ways.)

7. Dick generally spends 25 minutes studying his daily spelling lesson. If by studying hard he can learn it in 15 minutes, how much time would he gain in 6 days by studying hard?

8. The teacher has a box of 45 pencils. She asks 5 boys to sharpen them for her. If each boy takes the same number, how many will he sharpen?

9. If 4 other boys help the 5 boys sharpen the 45 pencils, each will sharpen —— pencils.

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XXVI. PROBLEMS: MISCELLANEOUS

1. In Sarah's school the children agree with the teacher to spend 6 minutes a day in "housekeeping"; that is, in helping keep the schoolroom neat and clean. How many minutes does each pupil spend in this way during a school week? This amounts to —— hours in a fortnight.

2. Mrs. Thomas buys a handkerchief for $0.35 and a yard of ribbon for $0.22. She passes the clerk $0.75. Count out her change.

3. A coal dealer buys coal from the mines for $9.10 a ton. He sells a ton to Mrs. Sampson for $11.25. How much does the dealer make? Is this all profit?

4. Henry and James are measuring two different strips of wood. Henry says that his stick measures $1\frac{1}{4}$ feet. James says his measures 18 inches. Which is longer, and how much? (Can you do this in two ways?)

5. Harold earns money by doing odd jobs out of school. A neighbor pays him at the rate of $0.15 an hour. If he works only 30 minutes he should receive ——.

6. Harold works 20 minutes a day for 3 days. If he receives $0.15 an hour, how much should he receive for his three days' work? (Do this in two ways.)

7. Mrs. Hart has 5 yards of cloth that she wishes to make into aprons for 4 little girls. If she uses all the cloth and makes all the aprons of the same size, how much cloth will be used for each apron? (Do this in two ways.)

Additional Work. *Each pupil should write out and bring to class a similar problem of his own.*

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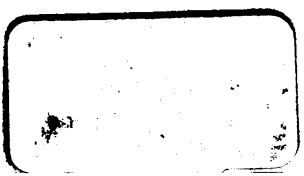

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